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THE ULCER PROBLEM*

(I) Etiology, with Special Reference to an Inter-relationship Between the Vascular and the Acid-Peptic Digestive Factors.

(II) Characterization of a Satisfactory Operation Which Will Protect Against Recurrent Ulcer.

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IT is indeed a rare privilege to be asked to give one of the triennial lectures of your Association commemorating Lister, easily first amongst all surgeons of all time. My sense of genuine appreciation of this high honour is marred not alone by the knowledge that this compliment is ill-deserved, but also by serious personal misgivings over being able to bring something to you suitable to the occasion.

Pope once said: "His praise is lost who waits till all commend". So many eulogies have been spoken of Lister, his life and his great work, that it would ill befit me on this occasion to attempt to tell again what others before have said with lustre. If I were to attempt to add another stone to the coping-stone of encomiums with which Lister's life and work has been crowned, it would appear out of place and a slight to those who have done their work so well. Your own inimitable Archibald on a similar occasion said: "The chorus of his praise has become almost a liturgy, and one can only hope to write the liturgy in somewhat different phrases". It is fitting in contemplating the life of this great benefactor of surgery and society that we resign ourselves to the piety of memory, renew acquaintance with his ideals and reflect for a moment upon the arduous labours and glory of this great and good man. We need the example of men like Lister more than they need our praise. On the occasion of the Lister commemoration, it is fitting that we rededicate ourselves to the noble tasks which he so greatly advanced.

Accompanying publication of the first Listerian Oration by your own late John Stewart, of Halifax, the Lister Memorial Club of your Association made this announcement: "The first Listerian Oration published herewith is very properly concerned with the life and work of Lord Lister himself; subsequent orations may draw not only upon the various items associated with Lister's life, but may include also the story of all great and important advances in scientific surgery and medicine". I hesitate to be the first to break with the tradition of dealing with surgery in a historical manner on this important occasion, but with the kind permission of your officers, I shall attempt to tell you briefly something of the skirmishes that my associates and I have been having with the ulcer problem. Did not Lister himself break more forcibly with tradition in surgery than anyone else has before or since? Having the permission of your officers and the precedent of Lister's own example, I will embark on this undertaking without attempts at further justification.

THE ASPECTS OF THE ULCER PROBLEM TO BE DISCUSSED

This is not the place nor would time permit a general survey of the problem of ulcer. Your own Babkin (1944) has reviewed in a comprehensive manner the whole problem of gastric secretion and its relation to the ulcer problem. Rather, it is my intention in the time available to me to acquaint you with studies which my associates and I have been prosecuting on phases of the ulcer problem: (1) etiology, with special reference to an inter-relationship between the

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vascular and the acid-peptic digestive factors in the genesis of ulcer; (2) characterization of a satisfactory operation which will protect against recurrent ulcer.

My associates who have lent special impetus to the experimental phases of the work reported herein are: Drs. R. L. Varco, L. J. Hay, B. G. Lannin, K. A. Merendino, F. Kolouch, and I. Baronofsky. These men have successively spent a year or more in the Experimental Laboratory of Surgery. And during the last seven years, covering the period of their tenure in the laboratory, various phases of the ulcer problem have been worked upon intently. All of these men have had an important rôle in wresting from nature the observations reported herewith.

I.

ULCER PRODUCTION

Ulcer of the stomach and/or duodenum may be produced experimentally by several means. A number of occurrences have suggested the great importance of the acid-peptic digestion factor in the origin of ulcer. Foremost amongst these are: (1) the Mann-Williamson operation (1923) in which the bile and pancreatic juice are diverted away from the gastric outlet; and (2) the attachment of an isolated gastric pouch to a short intestinal loop, attached in turn to the jejunum or ileum (Matthews and Dragstedt, 1932). In both these procedures, no opportunity being available for the usual neutralization of the acid-peptic digestive juice by the alkaline digestive juices, ulcer follows both these procedures in nearly 100% of instances.

These circumstances, though they serve to emphasize the significance of unneutralized gastric juice in the genesis of ulcer, are nevertheless quite artificial. An important deterrent to general acceptance of the acid-peptic theory in the genesis of ulcer as suggested by these experiments was failure to produce ulcer by histamine, the most profound known stimulant of gastric secretion. Orndorff, Bergh and Ivy (1935) carried out a diligent attempt to provoke ulcer in dogs with histamine. Ten dogs were injected subcutaneously with 2 mgm. of aqueous histamine every 2 hours, day and night, 10 times a day, the dogs being allowed a 4 hour rest period daily. These daily injections extended over a period of 66 days. No ulcers were produced, but 4 of the 9 dogs in which the experiment was completed exhibited superficial erosions in the duodenum.

In 1939-1940 Charles Code, a graduate of the Medical School of the University of Manitoba at Winnipeg was working in our department of physiology at the University of Minnesota with Professor M. B. Visscher. Code was interested in the effects of histamine intoxication. Our laboratory in surgery was concerned with the problem of gastric secretion. We fused our efforts and through Code's interest a tool was created that has proved of real worth in studying the ulcer problem. Code and Varco (1940) implanted histamine-in-beeswax to permit its gradual liberation and thereby were able to elicit a prolonged histamine action. Employing 30 mgm. of histamine implanted in beeswax and injected once a day into dogs, ulcer could be produced quite regularly with doses not much larger than the total daily dose which was ineffective in the hands of Orndorff, Bergh, and Ivy (1935) when injected in aqueous solution.

The implantation of histamine-in-beeswax has proved a useful tool not alone in indicating the importance of the acid-peptic factor in the origin of ulcer, but at the same time it has constituted an excellent means of assaying the protective influence of a given operation against the ulcer diathesis.

In the earlier observations reported from this laboratory upon ulcer genesis, stress was placed primarily upon the acid factor. Subsequent observations have demonstrated that the peptic factor too is an item of importance in augmenting the injury occasioned by unneutralized acid. Kolouch (1945) observed that, when gastric juice containing both acid and pepsin, obtained from dogs with isolated gastric pouches under the influence of histamine stimulation, was dripped on to exposed mucosal surfaces of the antrum or duodenum in the dog, mucosal injury was greater than when hydrochloric acid alone of the same pH was employed as the dripping agent. Furthermore, observations made during the past two years suggest definitely that, ulcer may be produced by a variety of means which fail to augment gastric secretion. In these very experiments, acid peptic digestion is nevertheless an important agent in causing erosion and/or ulcer; that is, without the acid peptic digestive mixture gliding over the mucous membrane of the stomach or duodenum, ulcer would not occur. Before detailing some of these experiments, however, I would like to summarize the evidence on ulcer production in various animals with histamine stimulation.

A. *The histamine-in-beeswax provoked ulcer.*[29] —In Table I is shown in summary, the incidence

of ulcer production in various animals employing the histamine-in-beeswax technique. Only in the monkey and in the rabbit was it difficult to produce ulcer by stimulating the endogenous mechanism of the stomach to secrete. In the dog, the usual site of ulcer after histamine was very much like the spontaneous ulcer in man, the duodenum and the antrum being the sites of predilection. In the chicken and duck, the ulcers occurred in the gizzard; in the pig the squamous epithelium of the upper end of the stomach seemed most sensitive to acid-peptic

TABLE I.

INCIDENCE OF ULCER PRODUCTION IN VARIOUS ANIMALS ACCOMPANYING DAILY INTRAMUSCULAR IMPLANTATION OF HISTAMINE-IN-BEESWAX

Animal	*No. in series*	*Daily amount of histamine base milligrams*	*No. of days of injections*	*No. of ulcers*	*%*
Dogs.....	12	30	4-37	11	87.5
Guinea pigs.	8	5	2-11	6	75.0
Cats.....	5	5	3-28	4	80.0
Chickens...	3	7.5	4- 9	3	100.0
Ducks.....	2	20	20-26	2	100.0
Swine.....	3	40	13-15	3	100.0
Woodchucks	3	15-20	5-30	2	66.0
Calves.....	4	30 to 150	1-50	2	50.0
Monkeys...	4	20-50	23-59	1*	25.0
Rabbits....	8	7.5 to 30	5-41	1*	12.5

*Superficial erosive ulcer.

digestion and all the ulcers occurred in the cardia with perforation on to the pancreas. Perforation was frequent in the cat and guinea pig. In the main, the duodenum in most of our experimental animals, as in man, appeared to be a favourite site of ulcer formation; in many, however, the ulcer was in the stomach, and a number of animals presented both gastric and duodenal ulcers.

It is interesting that it was possible to produce ulcer quite regularly in the rabbit employing the histamine-in-beeswax technique, upon discarding the cellulose pulp of cabbage, carrots and lettuce, feeding only the juice which went through the press. By this means it was possible to get the rabbit's stomach empty, permitting the acid-peptic digestive mixture an opportunity to attack the gastric or duodenal wall directly. Perforated ulcers of the duodenum were produced in all of 4 rabbits subjected to this modification of the experiment.

B. *The vascular factor in ulcer genesis.*—Most of us come slowly to conclusions which are at variance with our previously held ideas. The import of the production of ulcers by the histamine-in-beeswax technique was to re-emphasize the significance of the acid-peptic digestion factor in the genesis of ulcer. No ulcer without free hydrochloric acid has come to be a commonplace expression. The frequency with which a bleeding ulcer becomes manifest for the first time in persons in the sixth or seventh decade has, undoubtedly, seemed a little unusual to clinicians who hold to the acid-peptic factor as being the important determinant in ulcer genesis. If those patients harboured the ulcer diathesis, why did they not manifest symptoms earlier in life?

In 1931, suction applied to an indwelling duodenal tube became standard practice in this clinic in the postoperative management of abdominal cases to prevent intestinal distension. Prior thereto, hæmatemesis was observed occasionally as a postoperative complication, especially in peritonitic distended abdomens. With the commencement of the use of suction as a routine postoperative measure to prevent the occurrence of distension, hæmatemesis disappeared as a postoperative complication. Eiselsberg, it is to be recalled, described this occurrence in 1899, and attributed it to retrograde thrombosis of the gastric wall, reaching the stomach via the omentum and mesentery. Payr (1907, 1910), and Wilkie (1911) both observed that retrograde embolism of the veins of the stomach with resultant formation of gastric erosions and/or ulcer could be produced by injection of particulate matter into the veins of the omentum. Wilkie's paper is written with that clarity of style that characterized all his work. In addition, his paper is accompanied by beautiful illustrations, several of which are in colour.

1. *Fracture and hæmatemesis.*[69]—

CASE 1

In 1940, severe hæmatemesis was observed in a man, L.W., aged 36, admitted December 9, 1940, with multiple fresh fractures sustained in an automobile accident. Fat was demonstrated in the urine the day following admission. A few days later repeated hæmatemesis and melæna, persisting a week and necessitating several transfusions of blood, occurred. The prothrombin time and vitamin C level in the blood were normal. The patient eventually made a satisfactory recovery and was dismissed to his physician on February 26, 1941. There had been no antecedent story of ulcer or bleeding.

CASE 2

The above occurrence was looked upon as a fortuitous circumstance until Mrs. K.A., aged 82, was admitted directly after having sustained a fractured neck of the left femur in a fall on March 15, 1942. During the next few days, the patient was mentally

confused and also incontinent. The hæmoglobin was 11.9 gm. On March 25 vomiting of blood and melæna occurred. There was quickening of the pulse and mild shock. Transfusions of blood and a constant intragastric drip of Varco formula No. II was begun on March 26; despite the transfusion of 1,000 c.c. of blood, the hæmoglobin was only 7.8 gm. The patient's condition worsened and death occurred March 29. There had been no antecedent story of ulcer prior to the fracture. At autopsy, an ulcer 15 x 22 mm. was found in the first portion of the duodenum on the posterior wall. The edges and floor of the ulcer were soft and the base appeared somewhat necrotic. Bronchopneumonia was present and the presence of a fracture was verified. Microscopically, the ulcer extended through the circular muscle of the duodenum and an interstitial antral gastritis was found.

CASE 3

Soon thereafter, a third patient, a young man, aged 17, was admitted on July 31, 1942, 11 days after having been injured in an automobile accident. He was unconscious for 5 days following the accident. When admitted here, a compound fracture of the right femur was present with considerable comminution of the shaft; there was also fracture of the right ankle, a hæmatoma in the scalp and a deep laceration of the right hand. Hæmatemesis occurred on August 8, 1942, and coffee-ground emesis thereafter was not infrequent, until death, which occurred August 15. The patient's course was febrile and stormy. Blood cultures were repeatedly negative. At autopsy the presence of multiple fractures was verified. A mucosal erosion 5 mm. in diameter was present in the midportion of the corpus of the stomach along the greater curvature. There was submucosal hæmorrhage about it. A submucosal area of hæmorrhage measuring 4 mm. in diameter was present at the lesser curvature, 2 cm. above the pylorus. Four additional hæmorrhagic areas were present in the antral mucosa measuring approximately 2 mm. in diameter. Microscopically, minute miliary abscesses were observed in the heart, liver, pancreas and brain.

CASE 4

In the meanwhile, a fourth patient, a Mr. E.C., aged 68, was observed in whom melæna occurred after fracture; he gave the following story. He was admitted with a fresh fracture of the neck of the right femur on March 27, 1942. On May 1, 1942, hæmatemesis and melæna occurred. The stools were consistently positive for blood. The patient had undergone gastrojejunostomy elsewhere 18 years previously for a duodenal ulcer. He had experienced occasional transient epigastric distress in the intervening years, but this was the first hæmorrhage since operation. An x-ray film on May 27, 1942, showed a large stomal ulcer 2 cm. in diameter. The patient did well on an ulcer regimen and was dismissed to his home on crutches on May 29, 1942. There has been no recurrence of melæna.

The pathological records of Dr. Bell's department revealed, over a 7 year interval (1926-1932) 15 additional cases of fracture in which hæmatemesis, ulcer and/or erosion, gastric and/or duodenal, was noted in the records of the postmortem examinations on fracture cases.

2. *Experimental production of ulcer and/or erosion by fracture or curettement of bone marrow.*[49, 50]—These observations just reported suggested the necessity of determining whether ulcer could be produced by fracture. A series of 6 guinea pigs was subjected to fracture of a femur. Some of the guinea pigs received repeated fractures of other long bones at weekly intervals. One developed a gastric ulcer. Two others exhibited a gastroduodenitis. An equal number of cats was treated in a similar fashion. No gastro-intestinal pathological results were noted.

Fifty-two dogs were subjected to a drill hole through both cortices of the humerus, a drill hole with curettage of the bone marrow, or fracture. These animals were sacrificed at various periods of time up to 23 days: 53% developed gastroduodenal disease. Erosions and/or ulcer of the stomach or duodenum were produced in 11 dogs (21%). In one instance a perforated duodenal ulcer was observed.

This evidence suggests a causal relationship between fracture and acid-peptic ulceration of the stomach and duodenum. Three possible explanations have been proposed: (1) A histamine effect from the fracture site with stimulation of gastric secretion; (2) fat embolism; (3) a combination of these two factors.

The fasting gastric samples of 10 fracture patients were analyzed for acid and volume. These samples were obtained the day following fracture and for several subsequent days. No stimulatory effect on the gastric secretory mechanism was observed as judged in the light of responses of normal patients without fracture.

Six dogs with isolated gastric pouches were studied. The operative trauma consisted of a drill hole through both cortices of the humerus, a drill hole with curettement of the bone marrow, or fracture. One animal exhibited a prolonged (24 hour) stimulation of gastric acid and volume following fracture. This result could not be reproduced in the same dog during a subsequent experiment.

Subsequently 18 intact dogs (including 3 controls) were subjected to a drill hole through both cortices of the humerus. Gastric aspirations were carried out daily for 23 days. No stimulation of the gastric response was observed in excess of that of the control animals nor of each individual dog's standard fasting curve prior to the trauma to the bone. In consequence, it may be concluded that a histamine effect is not the primary cause of the observed erosions or ulcerations of the stomach and duodenum following fracture.

3. *Ulcer production by the intravenous injection of fat.*[3]—It next remained to be determined whether ulcer could be produced experimentally

by the intravenous injection of fat. Human breast or omental fat was employed, obtained from surgical procedures and extracted with ether. One and one-half c.c. of fat per kilogram of body weight was injected intravenously. It has previously been stated that rabbits are quite refractory to ulcer production by histamine alone. In each of 6 rabbits, whose weights averaged 1.74 kilograms, a single intravenous injection of 1.5 to 2 c.c. of fat was made. Then 30 mgm. of histamine-in-beeswax was implanted once daily for from one to four days. No dietary strictures were imposed on the rabbits. A perforated ulcer occurred in each instance save one, and that rabbit died of pulmonary embolism shortly after the fat injection (Fig. 1). Three rabbits were injected with fat but were given no histamine. Ulcer did not develop. In two additional rabbits, a daily implantation of 30 mgm. of histamine-in-beeswax was made; in one over a period of 28 days, in the other for 28 days; neither developed ulcer.

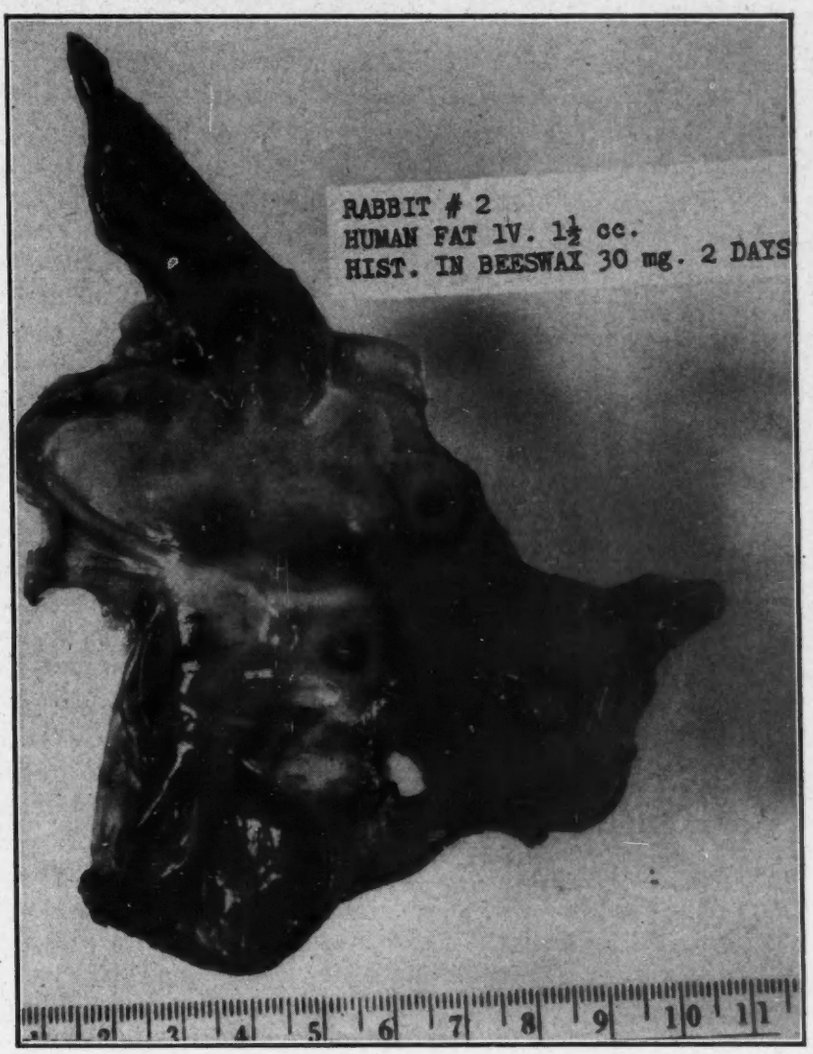


Fig. 1.—Perforated ulcer in stomach of a rabbit after single injection of 1.5 c.c. of human omental fat. Histamine-in-beeswax (30 mgm.) was given for 2 days. The rabbit is quite refractory to the production of ulcer with histamine. In other words, the intravenous injection of fat sensitized the rabbit to ulcer. (Illustrations of ulcer produced in various animals by histamine accompany the paper by Hay *et al.*, in *Surg., Gyn. & Obst.*, **75:** 170, 1942).

Similar studies were carried out on cats, dogs and guinea pigs which received no histamine. A single intravenous injection of fat, 1.5 c.c. per kilogram in amount, was made into each animal; of 6 cats injected, 2 developed ulcers; one at 4, the other 18 days after the fat injection. Of 2 guinea pigs injected with fat, both exhibited typical gastric ulcers. Of 7 dogs given a single intravenous injection of fat, a bleeding duodenal ulcer was found in one dog sacrificed 14 days after the fat injection. Of 3 dogs that received 30 mgm. of histamine-in-beeswax daily following a single intravenous injection of fat, all developed multiple bleeding duodenal and gastric ulcers, within 3 days after the first injection of histamine.

Microscopic studies were made of tissues stained with Sudan III in all the 52 animals receiving fat intravenously, a single block of brain, lung, kidney, and stomach being studied in each instance. It is to be noted in Table II

TABLE II.

INFLUENCE OF TIME INTERVAL ON OCCURRENCE OF FAT EMBOLI ATTENDING THE INTRAVENOUS INJECTION OF FAT

Sacrificed from 1 to 4 days after fat injection: No. of animals	*Amount of fat injected*	*% of tissues revealing fat emboli:*			
		Lung	*Brain*	*Kidney*	*Stomach*
(A) 23	1½ c.c./kg.	91	60	73.9	47.8
Sacrificed from 5 to 21 days after fat injection:					
(B) 29	1½ c.c./kg.	41	11.1	34.4	3.7

that the identification of fat in the stained sections was considerably higher, especially in the stomach, in the animals sacrificed and studied within one to four days after the fat was injected intravenously.[4a]

4. *Interpretation of these observations.*—Fat injected intravenously does not stimulate nor augment gastric secretion in dogs with isolated gastric pouches. The mechanism of ulcer production undoubtedly is that of plugging the end vessels to the mucosa; the resultant anæmic areas in the mucosa become less resistant to injury and digestion by the acid-peptic juice, than is the normal mucosa. The rate of disappearance of the fat from the mucosal and submucosal gastric vessels is rapid as indicated in Table II. This circumstance undoubtedly accounts for the fact that hæmatemesis, erosions or ulcer have not been observed more commonly to accompany fracture of long bones in man. That fat emboli in the lung and brain are common occurrences in patients dying early after fracture of long bones is well known (Le Count and Gauss, 1915; Bissell, 1916). In response to an injury addressed to 50 American orthopædic surgeons concerning the occurrence of hæmatemesis or ulcer after fracture, 42 replies were received. None reported observing ulcer or hæmatemesis in patients not previously having ulcer. However, one instance very similar to Case 4 above was reported to me by Dr. R. C. Webb, of Minneapolis. His patient, like my Case 4, had undergone gastrojejunostomy previously for a duodenal ulcer; a temporary bleeding stomal ulcer appeared shortly after the fracture, which responded promptly to conservative management. Two surgeons each reported having observed hæmatemesis once after the manipulation of a stiff joint under anæsthesia.

The only previous allusion to the occurrence of erosion and/or ulcer following fracture, that I have been able to find in the literature, is to be found in a discussion of a paper by Sternberg (1907), entitled, "Experimental Production of Gastric Ulcers in the Guinea Pig". Sternberg was discussing the influence of alcohol in the production of ulcers and the process by which acute erosions become chronic ulcers. In the discussion of Sternberg's paper, Schridde stated that he had twice observed fat embolism at postmortem in the submucosal gastric arteries accompanying fracture. In one patient, a 70-year old man, there were numerous erosions and 20 superficial ulcers. The patient died of coma which had persisted following the fracture. Schmorl in a 6-line discussion at the same meeting of the German Pathological Society (1907) stated that, he, too, had observed punctate hæmorrhages in the gastric mucosa due to fat embolism following fractures and severe bodily contusions.

Florer and Ochsner (1945) recently reported the instance of a boy of 14 who sustained rupture of the thoracic duct and chylothorax following injury. The chyle was reaspirated and injected intravenously. The boy died of a perforated duodenal ulcer 25 days after receipt of the injury. Is one justified in wondering whether the fat from the injected chyle attained larger particulate size on standing in the pleural cavity thus giving rise to embolism on injection? In other words, did the intravenously injected fat play an important rôle in the development of the ulcer?

These studies on the relation of erosion and/or ulcer to fat embolism following fracture or amputation are by no means complete. With the helpful co-operation of Professor E. T. Bell and his associates of the Department of Pathology, we are now beginning to collect evidence on the presence or absence of fat emboli in the mucosal and submucosal vessels of patients dying of multiple fractures shortly after receipt of injury. In the few patients thus far studied, it would appear that fat embolism of the gastric end-vessels is just as common as it was in the experimental studies reported herein. It may be justifiable to ask whether bacterial emboli may not also give rise to gastric hæmorrhage.

5. *The epinephrine provoked ulcer.*[4]—The production of ulcer by the intravenous injection of fat suggested that an attempt be made to produce chronic vasomotor arterial spasm, to note whether ulcer would follow.

Fourteen rabbits were subjected to daily intramuscular injections of 2 mgm. of powdered epinephrine and 30 mgm. of histamine dihydrochloride computed as histamine base, each implanted in beeswax. The difficulty of producing ulcers in rabbits by implantation of histamine in beeswax alone has already been mentioned; however, in the 14 rabbits in which implantation of powdered epinephrine was made in beeswax, accompanied by the simultaneous administration of histamine-in-beeswax, ulcer or erosion occurred in each instance. Seven rabbits had 1

or more perforated gastric or duodenal ulcers. Of the remainder, 2 showed bleeding gastric ulcers and the rest had multiple bleeding gastric ulcers in the fundus or pylorus. There was evidence of gross hæmorrhage into the gastrointestinal tract in all. The average length of survival was 4 days. Controls given histamine-in-beeswax alone up to 10 days showed no evidence of either erosion or ulcer.

Two dogs were given intramuscular injections of 8 mgm. of epinephrine in beeswax daily. One animal died of gastrointestinal hæmorrhage after 4 injections and the other after 2 injections. Marked dilatation of the stomach and a severe gastritis and duodenitis with multiple erosions and bleeding points in both stomach and duodenum were noted in both of these dogs. A small shallow duodenal ulcer was noted in one. Fresh blood was present in the stomach and duodenum in both dogs. In 2 guinea pigs, 2 mgm. aqueous adrenalin was suspended in gelatin and injected intramuscularly. In both guinea pigs erosions and shallow ulcers were observed in the stomachs after the daily administration of this dose of adrenalin for 3 days. Repeated tests with adrenalin in aqueous form failed to reveal any definite stimulation of gastric secretion in Heidenhain and Pavlov pouch dogs.

6. *The pitressin provoked ulcer.*—Dodds and associates (1934) produced superficial erosions and hæmorrhages in the mucosa of the fundus of the stomach of several laboratory animals by a single injection of pitressin. Later (1935) Dodds and his associates reported having produced chronic ulcer with perforation in rabbits by giving 40 c.c. of the British Pharmacopœia pituitrin by stomach tube once a week over 8 weeks. Ulcer was also produced by giving 5 c.c. of the British Pharmacopœia extract subcutaneously to rabbits every other day for 4 injections.

Dodds and his associates (1935) failed to obtain evidence of stimulation of gastric secretion with pituitrin. On the contrary, they observed evidence that pituitrin inhibited the usual stimulating effect of a small dose of histamine. Nedzel (1938) confirmed these observations of Dodds and his associates and stated that vascular interference with local nutrition of the gastric mucosa is the primary factor in the production of hæmorrhages and erosions. Byrom (1937) observed that the giving of large single doses of pitressin (740 pressor units) produced gross lesions in the kidney, liver, and other organs characterized by ischæmia and necrosis. Hæmorrhagic erosions also were observed in the stomach. Byrom believed these changes to be caused by an intense arterial spasm which produced ischæmia and necrosis.

The observations of Dodds and his associates and of Nedzel were confirmed in our own observations on cats, guinea pigs and rabbits. The depressant action of pitressin on gastric secretion also was verified on dogs with isolated Heidenhain or Pavlov pouches. The conclusion is that the chronic arterial spasm invoked by epinephrine or pitressin produces local areas of anæmia in the gastric mucosa which then become susceptible to the acid-peptic digestive activity of the gastric juice.

7. *The production of bleeding from gastric and œsophageal erosions and/or ulcer invoked by obstruction of the portal circulation.*—Gastric hæmorrhage in obstruction of the portal vein or its tributaries is not an uncommon clinical occurrence. Such bleeding usually has been attributed to the bursting of mucosal or submucosal œsophageal varices. Patients with obstruction of the superior vena cava exhibiting œsophageal varices, do not bleed however. May not the increased venous pressure resulting from portal obstruction render the gastric mucosa more susceptible to erosion of the acid-peptic digestive juice? It appears safe to conclude that arterial spasm of the gastric end-vessels invites erosion of the gastric mucosa by the acid-peptic digestive activity of the gastric juice. Why should not mucosal congestion brought about by venous stasis lead to the same result?

To test the validity of this hypothesis, the following experiments were carried out on rabbits and dogs in three series. In each series a partial obstruction to the normal venous return of blood from the stomach to the portal system was made. In two of the series, the normal flow of venous blood from the left gastro-epiploic vein into the splenic was obstructed by a tie placed proximal to their juncture. In the third series cellophane was placed snugly around the portal vein as it lay in the gastrohepatic omentum. Pearse (1940) has shown that cellophane, when placed around the aorta, will slowly obliterate this vessel, an occurrence occasioned through the agency of a severe fibroblastic reaction within six weeks of the placement of the cellophane ligature. These procedures were tolerated very well by the animals, and all ani-

mals were eating and drinking normally as soon as the effects of the anæsthetic wore off. After an interval of 2 days after operation in the splenic-tie series and an average of 113 days in the portal-tie series, the daily administration of 30 mgm. of the histamine-in-beeswax mixture prepared after the method of Code and Varco (1940) was commenced. The time of sacrifice in the dogs was determined by the occurrence of spontaneous hæmatemesis, melæna or extreme weakness. The rabbits were sacrified at varying periods of time. In all animals the stomachs were weighed. An effort was made simultaneously to garner control data on the weights of normal stomachs in both rabbits and dogs.

Results.—Transient immediate increase in size of the spleen attended partial venous obstruction of the stomach and splenic vein. In the dogs with obstruction of the portal vein, a well-developed collateral circulation was noted. The veins of Retzius, the anastomosis of the superior hæmorrhoidal vein, the œsophageal veins and the veins coursing through the omentum were uniformly enlarged and prominent.

In series I consisting of 5 dogs, the splenic, the left gastric and the left gastroepiploic veins were divided and tied. Two days later the administration of 30 mgm. of histamine-in-beeswax was commenced. The dogs were sacrificed when they appeared ill, 4 on the fourth day after ligature of the splenic vein, and the other on the sixth day. All dogs exhibited severe bleeding and there were large duodenal and/or gastric ulcers in all. Three exhibited erosions in the

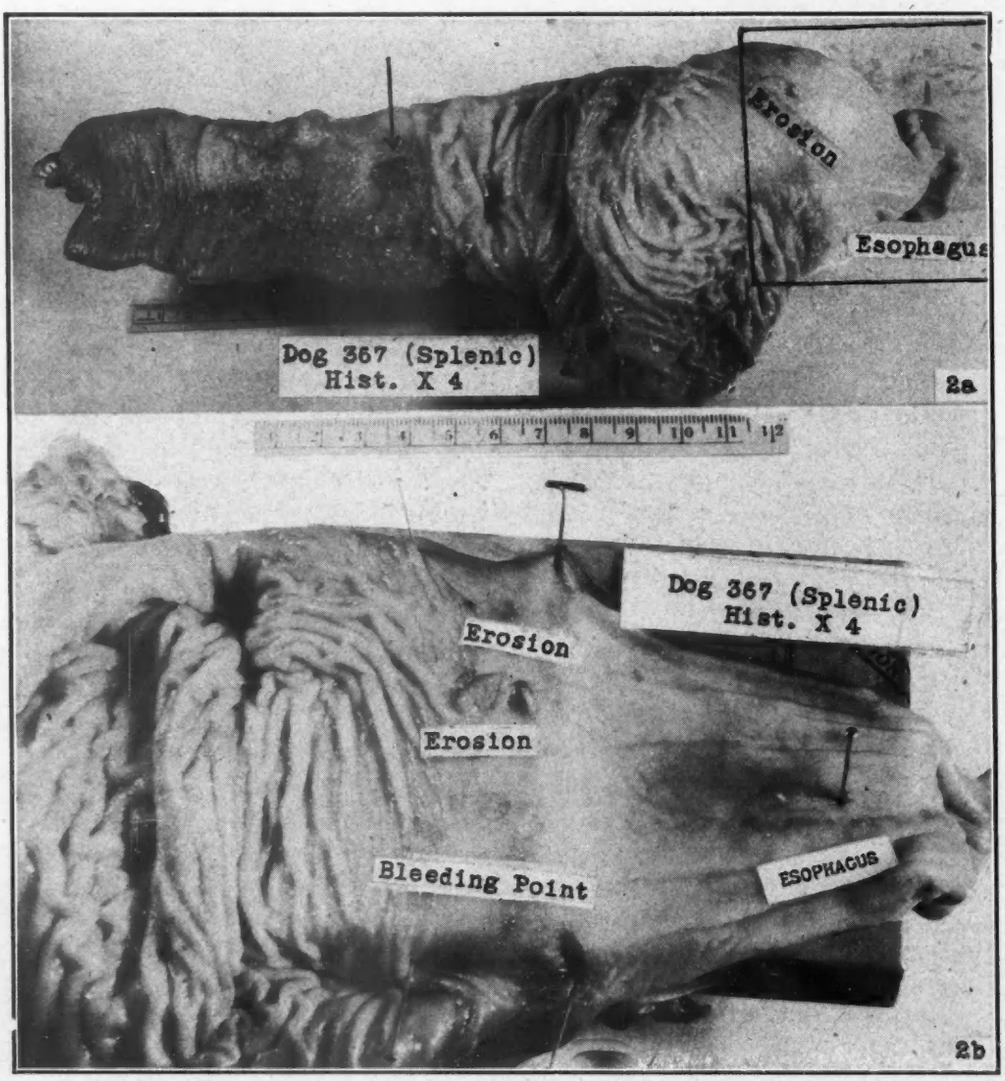


Fig. 2.—Duodenal ulcer (a) and peri-œsophageal erosions (b) in the upper end of the stomach in a dog after ligature of the splenic, left, gastric and left gastro-epiploic veins. The dog received 30 mgm. of histamine-in-beeswax daily for 4 days. There was considerable blood in the stomach. (a) Orientation photograph. (b) "Close-up" of bleeding erosions in upper end of the stomach.

lower end of the œsophagus (Fig. 2). Five other dogs were employed as controls. In 2 the veins were tied, but no histamine was given. These dogs were sacrificed 71 days later. No ulcers or erosions were found. In 3 other dogs, no vein ligatures were made, but the dogs were given 30 mgm. histamine-in-beeswax daily, for 2 to 4 days before sacrifice. None of these exhibited erosions or ulcer. The stomachs of all dogs with vein ligatures were distinctly heavier than the 2 control dogs which received histamine alone.

In Series II, there were 4 dogs, in all of which the portal vein was obstructed by a cellophane ligature. Two received histamine-in-beeswax; 2 did not. The 2 dogs receiving histamine were killed within 3 days after commencement of its administration. Both these dogs exhibited large perforating duodenal ulcers. In one there was bleeding from an eroded œsophageal varix. The other dog exhibited multiple bleeding gastric ulcers. The 2 dogs not receiving histamine had heavy stomachs, but exhibited no ulcers. In one there was a submucosal hæmorrhage in the lower end of the œsophagus. The portal vein had been obstructed 150 days before.

TABLE III.
WEIGHTS OF STOMACHS OF RABBITS SUBJECTED TO SPLENIC VEIN LEFT GASTRIC AND GASTRO-EPIPLOIC VEIN LIGATION WITH OR WITHOUT HISTAMINE

No. of rabbits	*Procedure*	*Average weight of rabbits*	*Average weight of stomachs in grams*
13	Splenic-tie Histamine	1.8 kg.	32.03
11	No splenic-tie No histamine	1.8 kg.	21.4
Controls: 4	Histamine-in-beeswax 30 mgm. every day for 17, 21, 21, 28 days respectively. No splenic-tie	1.8 kg.	21.3

In Series III, there were 18 rabbits. The vein ligatures were the same as in the dogs in Series I. In 9 rabbits, the vein ligatures were followed by the daily administration of 30 mgm. of histamine-in-beeswax for 1 to 7 days before sacrifice. In 8 of these 9 rabbits, bleeding erosions and/or ulcer were present. In two, bleeding erosive lesions in the lower œsophagus were present. There were 9 controls. In 4 rabbits, the vein ligatures were carried out, but the animals received no histamine. There were no erosions or ulcers. Five received histamine, but the veins were not obstructed. Neither erosions nor ulcers were observed in this group.

It is apparent from these experiments that obstruction of the venous drainage from the stomach abets the ulcer diathesis. That is, erosions and ulcer are far more readily provoked with histamine in the presence of portal hypertension than when there is no obstruction to venous outflow of blood from the stomach. The difficulty of producing ulcer in rabbits by histamine alone has been mentioned already. However, as is indicated herein, bleeding ulcers and erosions follow regularly when histamine administration is preceded by ligature and division of the splenic vein. In the dog too, ulcer is produced regularly in a surprisingly short time when the venous drainage from the stomach is obstructed, accompanied by the administration of histamine. Œsophageal varices were observed regularly in the experiments of longer duration, in which the portal vein was obstructed. Œsophageal erosions were observed in several of the dogs.

Another striking finding was the uniform increase in weight of the stomachs of both rabbits (see Table III) and dogs, in which obstruction to the venous outflow from the stomach had been established. Microscopically, this occurrence appears to be due to an œdema of the entire gastric wall, but especially of the submucosa. Erosion of the mucosa by acid occurs readily when the blood supply has been altered by obstructing the venous outflow.

C. *Clinical observations.*—In this section it is my purpose to draw attention to two clinical features relating to the preceding recitation of experimental observations. The first of these relates to a group of cases presenting occult bleeding from the gastro-intestinal canal, in which antecedent studies, if made before shock and severe anæmia supervened, are negative. The conditions, represented in the case histories to be recited are well-known pathological entities. The cause of the bleeding remains obscure and death supervenes because of uncontrolled hæmorrhage. At autopsy, the surprise finding is usually a small superficial erosion with a sclerotic artery in the base of the erosion. If no ulcerative lesion in the mucosa is detectable grossly, microscopic examination discloses either an arterial thrombosis of a segment of the gastric wall or an ulcerative gastritis with atrophy of

the mucous membrane. My special purpose in listing these cases is to indicate that the gastric mucous membrane is frequently a source, if not the *usual* source of occult bleeding from the gastro-intestinal canal; and that a 75% gastric resection, as is done for ulcer, usually will rescue these patients from death from hæmorrhage.

The second group is represented by 4 patients with portal hypertension caused by cirrhosis of the liver or thrombophlebitis of the portal and/or splenic vein. In this group of patients, all of whom have presented severe anæmia from hæmatemesis and/or melæna, an extensive (90%) gastric resection has been done on the thesis that the bleeding was an erosive process occasioned by acid-peptic digestion of the gastric and lower œsophageal mucous membrane in the presence of portal hypertension causing venous stasis. The clinical and x-ray diagnosis of the cause of bleeding in all these patients has been *œsophageal varices.*

1. *Hæmatemesis and melæna from superficial gastric erosion, arterial thrombosis of a gastric vessel or ulcerative gastritis.*—

CASE 1

Mr. H.J., aged 44, admitted June 5, 1944, because of hæmatemesis and melæna. Four transfusions for bleeding and shock before admission. Hæmoglobin on admission, 4 gm. Hæmatemesis continued and despite several transfusions hæmoglobin was brought only to 6.5 gm. Exploration on June 7. No lesion felt in the stomach or duodenum. A 75% gastric resection was done and in the excised specimen, high on the lesser curvature there was a tiny shallow ulcer about 2 mm. in diameter. The removed stomach weighed 130 grams. Microscopically, there was atrophy of the mucosa. There has been no recurrence of bleeding. On January 30, 1945, the hæmoglobin was 14.2 gm. The patient reported in again on May 2, 1945, stating that he was well and working.

CASE 2

Mrs. S.P., aged 56, admitted July 26, 1944, because of hæmatemesis and melæna. Five transfusions were given prior to admission and the hæmoglobin on arrival was 6 gm. By July 31, 1944, the hæmoglobin had risen under large daily transfusions of blood to 11.6 gm. Exploration was done July 31, 1944, under cyclopropane anæsthesia. No lesion in the stomach could be seen or felt, but a 75% gastric resection was carried out. The removed stomach weighed 130 gm. High up on the lesser curvature, and just a little removed from it on the posterior wall, there was a shallow ulcer 3 mm. in diameter. Microscopically, its base was necrotic; there was also atrophy of the mucous membrane, with some leucocytic infiltration.

CASE 3

Mr. R.E., aged 48, admitted January 10, 1944, because of hæmatemesis. The hæmoglobin was 4 gm. %. A diagnosis of carcinoma of the fundus of the stomach was made. After multiple transfusions, hæmoglobin came up to 14.2 gm. %. On admission blood pressure was 120/65, but the patient gives a story of previous hypertension and the retinal vessels show evidence of sclerosis. The patient was prepared for operation by constant intragastric dripping of a high protein and carbohydrate and low fat diet (Varco II). Transthoracic exploration was done February 14, 1944. The spleen was larger than normal, and the main splenic artery appeared to run directly into the fundus of the stomach, high up on the greater curvature. The fundus of the stomach to the left of the œsophagus felt rather thick and imparted a "corrugated feel" to the palpating finger. The spleen was excised and a piece of fundic stomach 6 x 4 cm. This excised specimen was then subjected to x-ray examination. The arteries in the gastric wall exhibited considerable calcification in the x-ray film. On microscopic study calcification as well as thrombosis was apparent. The bleeding apparently was occasioned by the plugging of the end vessels in the gastric wall. The patient returned for observation on September 19, 1945. He was well and there has been no further bleeding.

CASE 4

Mrs. A.S., aged 49, admitted November 9, 1944, because of repeated melæna. The patient is quite obese. She was hospitalized 5 times during the past year because of melæna. X-rays of the alimentary tract were negative as were also gastroscopic and proctoscopic examinations. Hæmoglobin 7.9 gm. Exploration on November 10, 1944. No findings. A 75% gastric resection was done on the thesis that a small bleeding point, not palpable through the gastric wall, was present. The removed specimen weighed 140 grams but showed no bleeding point. Microscopically an ulcerative gastritis was present. The patient did well and the hæmoglobin had risen to 12 gm. % at time of dismissal. There has been no recurrence of melæna and when the patient returned for observation on May 29, 1945, the hæmoglobin was 13.1 grams.

CASE 5

Mr. F.K., aged 45, admitted July 5, 1944, because of hæmatemesis and melæna. The hæmoglobin was 7 gm. The patient had been studied in the outpatient clinic on several occasions over the preceding 6 years because of abdominal distress. Repeated x-ray studies of the gastro-intestinal tract had been negative. Seven litres of blood were given prior to operation on July 11, 1944, at which time the hæmoglobin was 6.9 gm. Exploration save for a few hæmorrhages in the upper jejunum was negative. Dr. R. L. Varco called me to the operating room. I advised him to resect the stomach, indicating that one such resection already had been done by me for occult bleeding. The hæmorrhages in the jejunum however appeared to be a more tangible source of the bleeding and he removed a segment of the upper jejunum which exhibited several hæmorrhagic areas but no ulceration. The patient did poorly after operation, and continued to bleed. Six litres of blood were given in the postoperative period. The patient died of hæmorrhage on July 17, 1944.

At autopsy a very shallow erosion 2 mm. in diameter and less than 2 mm. in depth was found on the lesser curvature near the incisura angularis. There was an open vessel in its base. Additional areas of hæmorrhage, very much like those observed at operation were noted in the jejunum. Both the lumen of the ileum and the colon contained considerable blood. Microscopic study of the ulcer base revealed fresh granulations and a rather large arteriosclerotic artery in the submucosa beneath the ulcer.

DISCUSSION

The older pathological literature contains numerous references to patients who have come to autopsy in which death occurred from bleeding from a small, superficial erosion in the gastric mucous membrane, in which there was an

open artery in the base. Lewin (1908) reviews the earlier literature and lists additional cases of his own. Instances of this sort already had been described by Gallard in 1884. Buday (1908), in reporting such an instance of fatal hæmorrhage from a small erosion in the gastric fundus, located with difficulty at autopsy, states that the intimal thickening of the gastric arteries in the submucosa is frequently greater than in far larger vessels. Even extensive formal pathological studies relating to sclerosis of visceral arteries rarely mention the gastric arteries (Brooks, 1906; Dow, 1925). Arteriosclerosis, out of proportion to that found in the arteries of the body as a whole, may be encountered as a surprise finding in any vessel. Schwyzer (1907) reports such an instance, in which only the coronary arteries exhibited more arteriosclerotic changes than the gastric arteries.

Ophüls (1913) and Boles and associates (1939) stress arteriosclerosis of the gastric arteries in patients with ulcer as a part of a general process. Fetterman (1935), reporting from the Toronto General Hospital, indicates that intimal thickening of the submucosal arteries in resected stomachs removed at operation from patients with ulcer is a frequent finding.

Whereas such erosive processes as those reported herein appear ordinarily very innocent when the specimens are examined, the persistent bleeding from these areas belies their harmlessness. A sclerotic vessel does not close readily, and it is to be remembered that it is an artery that is opened usually. In a fatal hæmorrhage, attending a mediastinitis following perforation of the cervical œsophagus in which the carotid sheath was opened by me at operation to effect a more secure closure of the œsophageal perforation, I was very much surprised to note that the bleeding occurred from the carotid artery (1938). My inference was that, the thinner walled jugular vein should have been opened. Undoubtedly, however, the pulsations of the artery caused it to be the more easily eroded by the suppurative process.

Disse (1904) states that an end artery going out to the mucosa from the submucosal vessels supplies an area 2.5 mm. in diameter. The plugging of such vessels in older patients may be the precursors of bleeding from an erosive lesion.

2. *Extensive (90%) gastric resection for erosive hæmorrhage in portal hypertension.*—

CASE 1

Mr. F.K., aged 59, admitted to medical service January 27, 1945, because of recurrent hæmatemesis first noticed in 1938. In March of 1944, œsophageal varices were ligated elsewhere through a left thoracic approach. The patient bled again before leaving the hospital and there have been three additional spells of hæmatemesis since. A carcinoma of the right bronchus close to the carina also has been demonstrated since the ligation of the œsophageal varices. The hæmoglobin, when the patient was first seen in the medical outpatient department, was 7.52 gm. %. On February 6, 1945, a few days after admission to the medical service, the hæmoglobin was 9 gm. On February 9, 1945, patient began bleeding again and 500 c.c. of blood was given daily by the medical service over a period of 5 days, a total of 2,500 c.c. being given. At the end of this time, the hæmoglobin was 7 gm. After transfer to surgery, a litre of blood was given daily for 9 days including the day of operation, the hæmoglobin rising slowly to 12.3 gm. %. Blood was demonstrated constantly in the stool. Gastric analysis without histamine showed a maximum of 27 free acid and a total of 39°. A bronchoscopy done on February 5, 1945, showed a squamous cell carcinoma to be present in the right main bronchus. The x-ray findings of the chest were consistent with a carcinoma of the right lung. Liver function studies were normal. There was no ascites.

On February 23, 1945, a 90% gastric resection was done on the thesis that an increased portal pressure produced a passive congestion of the gastric mucous membrane, which, in the presence of free hydrochloric acid, made the mucous membrane more vulnerable to acid-peptic digestion. In other words, it is believed that bleeding from œsophageal or gastric varices is primarily an erosive rather than a bursting process. The blood loss in the operation was 1,190 gm.

The spleen was also large and was removed. It weighed 870 gm. The removed stomach weighed 225 gm. The portal and splenic veins were both large and their walls, as in an atheromatous process, were somewhat thick. The portal pressure was 25 cm. of saline solution. The liver appeared normal. The operative diagnosis was, therefore, primary thrombophlebitis of the portal and splenic veins.

The microscopic study on the spleen showed a condition of fibrosis consistent with the diagnosis of Banti's disease. The liver was normal microscopically. There were no areas of atrophy in the gastric mucosa and there was a moderate amount of intestinal antral gastritis present, as is commonly observed in duodenal ulcer.

The patient did well after operation and the hæmoglobin promptly rose to 14 gm. There has been no further evidence of bleeding. The patient was dismissed on March 6, 11 days after operation. On March 27, he returned for excision of the right lung which also was done by me on April 4. The lesion in the bronchus was quite near the carina, necessitating amputation close to the bifurcation of the trachea. The lung was universally adherent but was excised without difficulty. The lung weighed 620 gm. There was no tumour in the removed lymph nodes. The tumour in the bronchus extended over a distance of 3 cm. and practically occluded the bronchus. The biopsy diagnosis of squamous cell carcinoma was confirmed.

A transfusion of 1,000 c.c. of blood was given for this operation, the blood loss in operation being 1,450 gm. This is the only transfusion the patient has had since gastric resection. The patient did very well after operation and manifested very little operative reaction and was dismissed on April 15, 11 days after operation. The hæmoglobin on April 11, was 10.5 gm.

There has been no melæna nor hæmatemesis since the gastric resection in February. The hæmoglobin on May 18, 1945, was 10.9 gm. and 12.2 gm. on June 5. The patient's weight was 122 pounds, 10 pounds less

than before gastric resection and 6 pounds more than at the second admission for excision of the right lung. He believes he is making definite progress and appears to be doing very well.

CASE 2

Baby boy, R.O., aged 3. On July 28, 1944, splenectomy was done because of repeated hæmatemesis and melæna. The removed spleen weighed 170 gm. The liver appeared nodular and cirrhotic. A piece removed for biopsy showed definite cirrhosis microscopically. The patient was dismissed August 8, 1944. On April 11, 1945, the parents brought him back because of recurrent melæna. In hospital, vomiting of blood occurred necessitating transfusions for shock. The hæmoglobin, which had been 13.4 gm. on the first admission, fell to 5.6 gm. Under daily transfusions of 250 to 500 c.c. of blood, the hæmoglobin rose to 10.7 gm. on April 23, 1945, at which time a 90% gastric resection was done. The liver appeared somewhat more nodular than at the last operation. The portal venous pressure was not determined. A specimen withdrawn prior to operation for gastric analysis contained largely blood. No transfusions were given after operation and the hæmoglobin rose to 14.2 gm. Blood disappeared from the stool and when the patient left the hospital on May 6, 1945, he was eating well.

CASE 3

Mrs. M.V., aged 62, periodic melæna, vomiting, and diarrhœa over a period of years have been the patient's complaints. She also has pain in the back and x-ray examination discloses a hæmangioma in the twelfth dorsal vertebra. The spleen is palpable and is believed to be enlarged. There has been blood in the stool persistently and the hæmoglobin was 4.5 gm. upon admission. There was free hydrochloric acid in the gastric juice (59°). Recently ascites has developed. The hæmoglobin in July, 1942, done elsewhere was 7.4 gm. Between episodes of melæna and diarrhœa the hæmoglobin improves. After the transfusion of 3 litres of blood and iron and liver extract therapy, the hæmoglobin rose from 4.5 to 12.9 gm.

Operation was done May 24, 1945, the spleen was large and weighed 520 gm. upon removal. The liver appeared to be definitely cirrhotic. A small piece of the liver edge was removed for biopsy. The portal venous pressure measured in one of the veins of the great omentum was 35 cm. of saline solution. There was a good deal of new vessel formation in the mesenteries. The veins of the mesentery and bowel appeared very prominent. The spleen was excised. A 90% gastric resection also was done with the consideration in mind of reducing the capacity of the stomach to secrete acid. The resection was very difficult and tedious because of the vascularity and thickening of the suspensory ligaments of the stomach. The removed stomach weighed 160 gm.; there were no erosions. Microscopically there was antral gastritis and cirrhosis of the liver with marked fibrosis. The present hæmoglobin is 10.8 gm. and the patient is still in the hospital under observation because of fever suggesting the possibility of a subphrenic abscess.*

CASE 4

Mrs. E.H., aged 27, admitted May 21, 1945, because of hæmatemesis, melæna and a feeling of faintness. Blood has been present persistently in the stool since May 19, 1945. The hæmoglobin was 8.8 gm. In 1938, I removed this patient's spleen because of recurrent hæmatemesis, and melæna. There were a number of accessory spleneculi found. The diagnosis was thrombophlebitis of the splenic vein. The liver appeared normal. There has been no recurrence of hæmatemesis or melæna until just before admission. There is no ascites; liver function tests are normal. The patient had free hydrochloric acid in all of 4 samples, the highest value being 36°. Three transfusions of blood were given and the hæmoglobin rose to 11.7 gm. on the day of operation. On June 4, 1945, a 90% gastric resection was done. The liver appeared normal, no surviving splenic tissue was observed. The portal venous pressure measured in an omental vein is 49 cm. of saline solution. The mesenteric veins appeared full and were very prominent. The suspensory ligaments of the liver were extremely vascular and thick making dissection difficult. The omentum was universally adherent in the upper right quadrant and contained prominent veins. The fundic portion of the stomach was intimately adherent to the left diaphragm and pancreas over a wide extent. The removed stomach weighed only 114 gm. There has been little operative reaction and the patient is convalescing nicely from the procedure and was dismissed from hospital 7 days after operation.

* This patient died subsequently of a subphrenic abscess which was managed in too dilatory a manner.

DISCUSSION

The first operation in this group of patients with portal hypertension was done just a few months ago, and a longer lapse of time will have to be awaited before one can say with assurance that this is a satisfactory manner in which to control the bleeding in such patients. A fairly large number of patients with cirrhosis of the liver, as Eppinger (1937) has indicated, die of hæmorrhage before ascites or liver insufficiency supervene. The operations proposed by A. O. Whipple (1945), of excising the spleen and left kidney and uniting the veins of these two organs over a Blakemore tube, or of making a direct Eck fistula between the portal vein and the vena cava, obviously constitute a more direct attack upon the problem of portal hypertension. However, an Eck fistula *per se* apparently does not constitute an altogether harmless diversion of portal venous flow, as indicated by the earlier report from Pavlov's laboratory (see Enderlen *et al.*, 1914) as well as by the more recent report of G. H. Whipple and his associates (1945).

It perhaps should be indicated, too, that gastric resection in a patient with portal hypertension may be a more difficult operation than in a patient with ulcer. The omenta and tethering membranes and ligaments of the stomach are thickened up, owing to the new vessel proliferation. Dissection, in consequence, may be difficult, because of obliteration of normal tissue planes. In the ordinary gastric resection for ulcer, the operation may be accomplished with a blood loss of 300 c.c. or considerably less; owing to a tendency for all the dissected surfaces in portal hypertension to bleed, the blood loss is usually much greater. The employment of dry gauze sponges and weighing them at operation (1942)[66] however, keeps the surgeon apprised continuously of the magnitude of the blood loss, which loss may be replaced by an equal amount of transfused blood.

At the moment, we are engaged in determining whether the bleeding from gastric and œsophageal erosions, which can be created experimentally by the administration of histamine in the presence of portal obstruction, can be prevented by preliminary extensive gastric resection. If such should prove to be the case, it would augur well for the proposal of subjecting patients with hæmorrhage from increased portal venous pressure to the operative procedure described herein.*

II.

Characterization of a Satisfactory Operation for Ulcer

The second portion of this presentation will concern itself with an attempt at evaluation of the criteria of a satisfactory operation for ulcer. As indicated in the reports of vital statistics by the Department of the Census of the United States, there has been a significant drop in the mortality of both appendicitis and intestinal obstruction in the last decade. On the other hand, the mortality of duodenal and gastric ulcer per 100,000 population has continued very much the same over a period of 30 years. The complications of perforation, hæmorrhage and obstruction account largely for this mortality. In order to prevent perforation, we must learn to control the ulcer diathesis. The very frequency with which the tragic complication of perforation occurs, suggests that much remains to be learned concerning the control of the ulcer problem by conservative means. The opportunity should not be neglected to point out, however, that, the general application of the principles of closure of such perforations, as first enunciated by Roscoe Graham (1937) of the University of Toronto, have had a telling effect upon the mortality of perforation.

Surgeons have concerned themselves in an empirical fashion with the problem of attempting to relieve the ulcer diathesis for a period of more than 50 years. Out of this experience has grown a mass of conflicting data with reference to the accomplishment of the surgeon in the management of ulcer, without a clear cut definition of the criteria of an acceptable operation for ulcer. The surgeon knew only that the object of his craftsmanship was to prevent ulcer recurrence, but he did not know how that end was to be attained, nor did he know nor understand the items promoting or abetting the ulcer diathesis. Little wonder that he groped about aimlessly, striving to devise new procedures or modify old ones which might achieve his objective. Little wonder that the high incidence of recurrent ulcer after operation justified internists, actuaries, and the medical departments of our Allied Forces in their distrust of what surgeons affected to be able to accomplish for the patient with an ulcer refractory to medical management.

Evaluation of the criteria of a satisfactory operation for ulcer.—This story has been told in part previously.[37, 38, 68] The histamine-in-beeswax technique has proved a most useful instrument in assaying the worth of a given operation. Before that tool became available, however, this study already was on its way in patients. In brief, it may be said that in patients as well as in dogs to which histamine-in-beeswax is administered to note whether a given operation will protect against the histamine-provoked ulcer, the results are in concurrent agreement. In man, a study of the incidence of recurrent stomal ulcer after each type of operation is the method of procedure; obviously not a commendable manner in which to determine the criteria of a satisfactory operation.

From these studies, the characters of a satisfactory operation which protects against recurrent ulcer appear to be: (1) an extensive gastric resection (75%) affording promise of reduction in gastric secretion; (2) excision of the antral mucosa. This proof emanates from operations on man alone, but appears to be well substantiated in the reports of Ogilvie (1938), Wangensteen and Lannin (1942) and McKittrick, Moore and Warren (1944). The patient reported upon previously[68] from this clinic continues well, now almost five years after excision of the antral fragment of mucosa, left behind in the first operation, in which a three-quarter resection was followed by a recurrent stomal ulcer. (3) Fairly complete excision of the lesser curvature of the stomach appears justified in that ulcer occurs primarily in the unrugated portions of the first portion of the duodenum and along the lesser curvature of the stomach. Kolouch's (1945) drip experiment apparently suggests that unrugated mucosal strips are more susceptible to injury in that periodic momentary escape from

* Preliminary experiments on dogs suggest definitely that, a 90% gastric resection affords real but not absolute protection against the histamine-provoked ulcer, in the presence of portal hypertension. Under these very same circumstances, a 75% gastric resection affords no protection against the histamine-provoked ulcer—an occurrence which indicates how strongly portal hypertension abets the ulcer diathesis.

the unrelenting dripping of the acid-peptic digestive juice is not permitted the unrugated surface. Hence the greater vulnerability of the unrugated duodenal cap and the lesser curvature to the ulcer diathesis. (4) The importance of a short afferent duodenal loop in effecting gastro-intestinal continuity after an extensive gastric resection appears to have been established. This is an item as susceptible of proof in the dog as in the patient. Both the proof from the experimental laboratory and the clinic will be cited herein, because it is my belief that this item is still, in many hands, an important factor in ulcer recurrence after an otherwise satisfactory operation for ulcer. The matter is important enough to warrant recitation in some detail.

The problem was subjected to experimental scrutiny in the following manner: Three series of experiments were carried out in dogs. In each series, a three-quarter gastric resection (75%) including excision of the pylorus and antrum was carried out. The only variable was the length of the proximal afferent duodenojejunal loop, the operations being carried out on the Billroth II plan of procedure with the Hofmeister modification of dealing with the lesser curvature.

A. *Proof of the importance of a short afferent duodenal loop in gastric resection.*[47]—

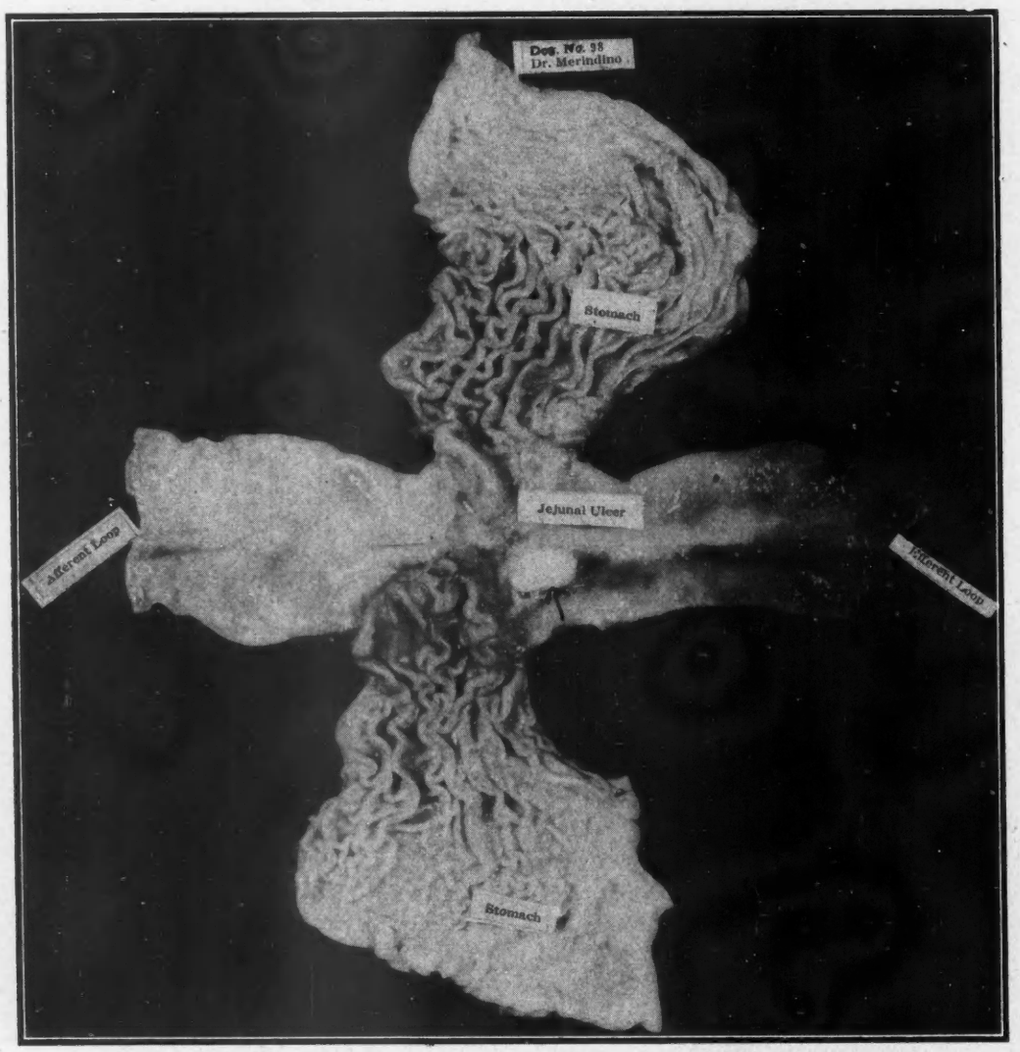


Fig. 3.—Spontaneous perforation of a stomal ulcer (no histamine) in a dog in which a 50% gastric resection (Billroth II) had been done, employing a long afferent duodenojejunal loop measuring 78 cm. in length from the inverted duodenal end. Death occurred from peritonitis 420 days after the operation. The overall length of the small intestine was 323 cm. Of 7 dogs in which 75% gastric resection was done, employing a long afferent duodenojejunal loop, followed by the administration of histamine-in-beeswax, all developed perforating or perforated stomal ulcer. In dogs that have had a 75% gastric resection accompanied by a short afferent duodenal loop, a stomal ulcer can not be produced by histamine.

Series I.—Eleven dogs were used. These dogs were subjected to an extensive gastric resection (75%). The gastrojejunostomy was performed as close to the inverted duodenal end as was technically feasible, the distance from the blind duodenal end varying from 12 to 15 cm. After this operative procedure, three months were allowed to elapse. Then 30 mgm. histamine base in beeswax, prepared after the method of Code and Varco (1940) was injected intramuscularly each day. A total of 40 to 45 injections was carried out on each animal. The animals were sacrificed after the last injection. In spite of severe histamine stimulation, not one gastrojejunal ulcer was encountered. This is significant.

Series II.—The identical operation described above (75% gastric resection) was performed on 7 dogs, with one difference. In these animals a longer afferent duodenojejunal loop was employed. The distance from the inverted duodenal end to the site of gastrojejunostomy varied from 27 to 78 cm. Similarly, a rest period of 3 months was allowed to intervene. Following this, 30 mgm. of histamine base in beeswax was injected intramuscularly daily.

A large, frequently perforated gastrojejunal ulcer was observed in each instance (100%). These results are in striking contrast to the results in Series I. Three of the 7 dogs in Series II died of generalized peritonitis attending perforation of a stomal ulcer. The dogs with the longest afferent duodenojejunal loops had the shortest survival periods.

Series III.—In a group of 4 dogs, gastric resection was done, varying in extent from 50 to 75%. The length of the afferent duodenojejunal loop in these 4 experiments varied between 78 and 144 cm. These dogs received no histamine. Two of the 4 dogs died of spontaneous perforation of a gastrojejunal ulcer located just beyond the efferent outlet (Fig. 3). One dog, in which a 50% gastric excision had been done accompanied by an afferent duodenojejunal loop of 78 cm., was sacrificed 210 days after operation. There was no stomal ulcer. One other dog is still alive and apparently well more than two years after operation.

COMMENT

The results of these experiments are striking. In 11 dogs (Series I), with an extensive gastric resection (75%), in which the afferent duodenal loop was short (12 to 15 cm.) stomal ulcer could not be provoked in a single instance by profound stimulation of gastric secretion with histamine-in-beeswax. In 3 of the 11 dogs, superficial gastric erosions were noted. In 7 dogs (Series II), in which the extent of the gastric resection was the same (75%), the only difference being that, the afferent duodenojejunal loop was longer (27 to 78 cm.), a gastrojejunal ulcer occurred following histamine stimulation in each instance. In a third series of 4 dogs with long afferent duodenojejunal loops, which received no histamine after gastric resection, varying in extent from 50 to 75%, 2 (50%) developed spontaneous perforated gastrojejunal ulcer.

B. *The importance of the length of the afferent duodenojejunal loop in indicating whether stomal ulcer will occur in the Schmilinsky-McCann operation.*—There has been much confusion and conflict of opinion concerning the item of complete intragastric regurgitation as it relates to the Schmilinsky-McCann operation. Schmilinsky (1918) suggested placement of the afferent duodenojejunal loop, in the Billroth II type of gastric resection, back on to the stomach in such a manner that complete drainage of all the duodenal contents occurred back into the stomach. He termed this arrangement an "internal pharmacy" for neutralization of gastric acidity, an item that is looked upon as a desirable factor in gastric resection for ulcer. McCann (1929) reported that he had produced gastrojejunal ulcer in 80% of 26 dogs operated upon according to the Schmilinsky plan. A number of other investigators, Ivy and Fauley (1931), Weiss, Graves and Gurriaran (1932), Graves (1935), Maier and Grossman (1937), and Wangensteen and his associates (1940) repeated the McCann experiment with rather indifferent results. None of these investigators was able to confirm McCann's observations of a high incidence of gastrojejunal ulcer following complete drainage of the duodenal loop back into the stomach. Wangensteen and his associates (1940) indicated that disastrous results attended performance of the Schmilinsky operation on man and suggested that constant regurgitation of the duodenal loop content back into the stomach might stimulate the second or gastric phase of gastric secretion interminably. Kesavalu and Mann (1943) have shown, in dogs with isolated gastric pouches, that the Schmilinsky procedure definitely enhances secretion from the pouch.

Methods of study and results.—A total of 17 dogs was studied. The Schmilinsky-McCann operation of complete intragastric return of the entire content of the duodenal loop was performed in each animal.

In the first series of 11 dogs, the operation was accomplished in the following manner: These dogs were anæsthetized and under septic conditions, a laparotomy was performed. The pylorus of the stomach was excised. The duodenal end was then closed and inverted in the usual fashion by means of interrupted cotton sutures. At distances of 8 to 15 cm. from the inverted duodenal stump, the intestine was transected. The proximal transected intestine was anastomosed on to the stomach. Thereby complete intragastric regurgitation of the duodenal contents including bile and pancreatic juice was assured. The end of the distal loop of intestine was closed and inverted. A gastrojejunostomy, end-to-side was then performed between the end of the stomach and the side of the distal transected intestine.

Following operation, convalescence was rapid. After a brief period of time, normal activity was assumed and appetite regained. At various intervals from 72 to 360 days these animals were sacrificed. In the 11 dogs in which a short proximal duodenal loop

was employed in the Schmilinsky-McCann procedure, gastrojejunal ulcer occurred only once (9.1%).

A second series of Schmilinsky-McCann operations subsequently was carried out on 6 dogs. The operation was identical in all details with that described in the first series of animals with one exception. In the first series, the intestine was transected a short distance from the inverted duodenal stump. Thus, a short proximal loop was obtained. However, in this second series of dogs, the transection of the intestine was carried out at a lower level. The length of the proximal loop from the inverted or "blind" duodenal end varied from 76 to 90 cm. The transplantation of the proximal loop was high on the stomach in some instances, low in others. In this second series, a short period of normal response was noted. As time progressed, however, the dogs became irritable, anorexic and languid, followed by coma and death. The average survival period was 79.7 days. The area of the transplantation (high or low) of the proximal loop on to the stomach, did not appear to alter the end result. The incidence of gastrojejunal ulcer in this series was 83.3% (5 out of 6 dogs). Four of the six dogs exhibited perforated peptic ulcers.

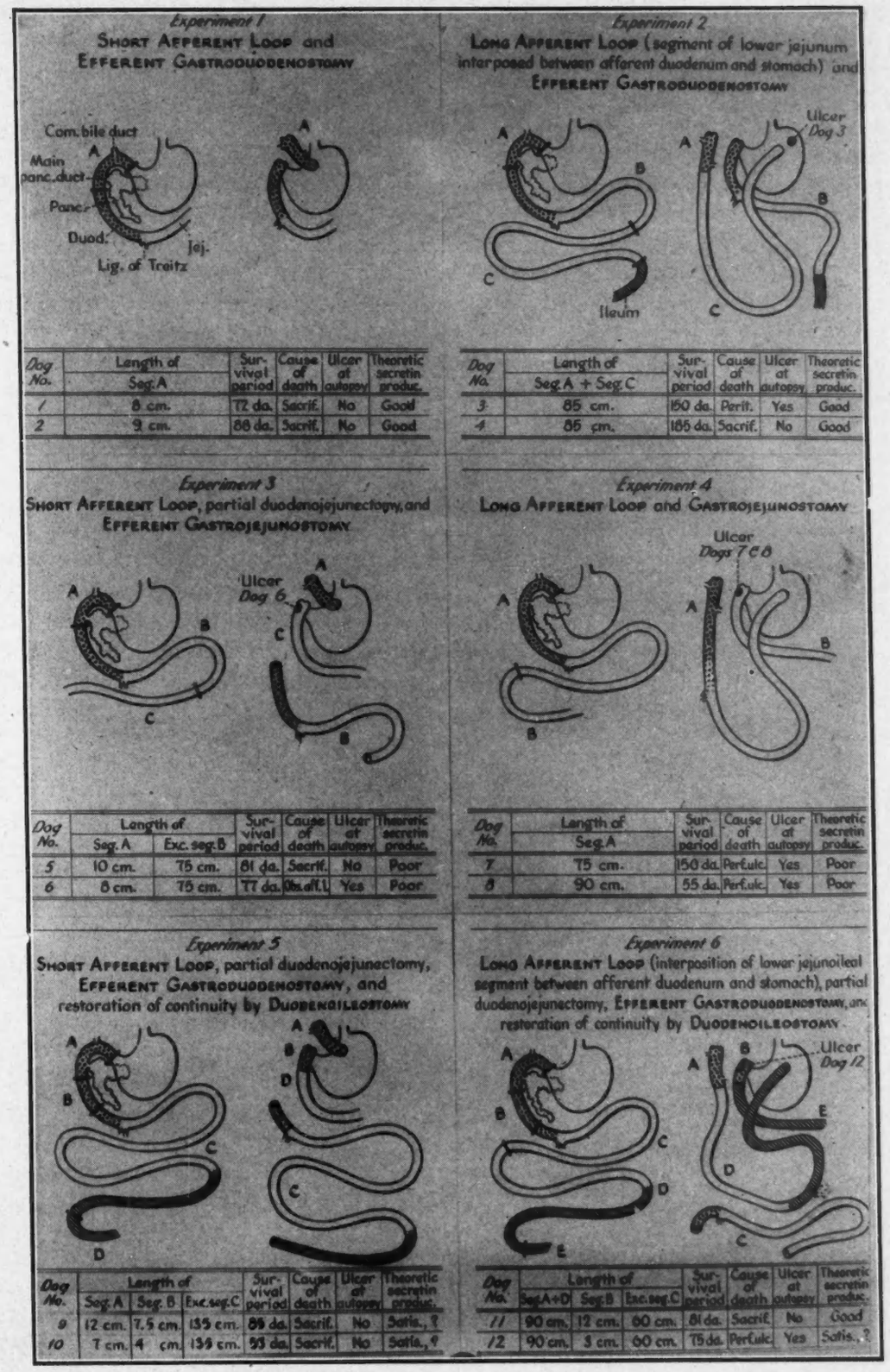
Comment.—These results clarify the confusion in the literature concerning the results of complete intragastric drainage of the duodenal loop in dogs. The results of the experiments reported herein suggest that the divergent results obtained by previous investigators are explicable on the basis of the length of the afferent loop employed. The agency through which the length of the afferent loop in the Schmilinsky procedure influences so definitely the occurrence of stomal ulcer is not apparent. One thing is clear however: exclusion of hydrochloric acid, the best physiological stimulus for the secretion of pancreatic juice with high buffer value, from contact with the duodenal mucosa, the segment of mucosa richest in secretin, affords a plausible explanation for the greatly increased incidence of stomal ulcer in the experiments in which the long efferent loop was employed.

C. *Why does a long afferent duodenojejunal loop invite stomal ulcer?*[34]—An attempt was made, without too much success, to determine definitely what the factor or factors are in a long afferent duodenojejunal loop that contribute to the occurrence of stomal ulcer. The operations depicted in Fig. 4 were carried out in 12 dogs. The 3 items examined with respect to their importance in the genesis of stomal ulcer were: (1) secretin factor; (2) the factor of spatial separation of alkaline and acid digestive secretions; (3) the sensitivity factor, implying an increased susceptibility of the mucosa of successively lower segments of the small intestine to injury by the acid gastric secretions.

Methods.—Six modifications of the total intragastric duodenal drainage operation of Schmilinsky and McCann were carried out in a series of 12 dogs (Fig. 4). The operations were devised to study the influence of both short and long afferent duodenojejunal loops on the development of stomal ulcer just beyond the efferent gastric outlet with special reference to an attempt to evaluate the significance of the three factors enumerated above. In other words, in addition to varying the length of the afferent loop, the site of the efferent outlet of the stomach was varied, permitting testing of the importance of the secretin factor and the item of mucosal susceptibility to corrosion by the acid gastric secretions. These latter objectives of the study necessitated the making of some rather complicated operative procedures. By transecting the duodenum just beyond the major pancreatic duct and interposing a loop of ileum between the proximal portion of the duodenum and the stomach, or by excising a portion of the duodenum and the upper jejunum in other experiments, it became possible to vary all the factors which we wished to scrutinize. In some experiments the afferent loop was long, yet the requirements of a functional secretin mechanism were met satisfactorily by placement of the entire length of the duodenojejunal segment beyond the major pancreatic duct at the efferent gastric outlet. By interposing a short segment of duodenal mucosa between a high ileal segment and the gastric outlet, it was possible to note when stomal ulcer followed, whether it occurred in the short duodenal segment or in the more susceptible high ileal mucosa beyond.

Results.—Five of the 12 dogs died of ulcer; in 4 of these, perforation was present. All ulcers were stomal in character, that is, just beyond the gastric outlet on the efferent loop, save one which occurred in the fundus of the stomach (dog No. 3). In dog No. 6 the ulcer was not perforated, death being due apparently to obstruction of the short afferent loop, an item which probably had something to do with the occurrence of the ulcer. The dogs which did not succumb to ulcer were sacrificed at intervals of from 53 to 185 days.

In only one of 5 dogs (20%) in which the theoretic quality of the secretin mechanism was good, did a stomal ulcer occur. In 3 of 4 dogs (75%) in which it was poor stomal ulcer occurred. In one of 3 dogs (33%) in which the quality of the secretin mechanism was questionably satisfactory, stomal ulcer occurred.


Experiment 1
SHORT AFFERENT LOOP and EFFERENT GASTRODUODENOSTOMY
Com. bile duct
Main panc. duct
Panc.
Duod.
Jej.
Lig. of Treitz
A
Experiment 2
LONG AFFERENT LOOP (segment of lower jejunum interposed between afferent duodenum and stomach) and EFFERENT GASTRODUODENOSTOMY
Ulcer Dog 3
B
C
Ileum
Experiment 3
SHORT AFFERENT LOOP, partial duodenojejunectomy, and EFFERENT GASTROJEJUNOSTOMY
Ulcer Dog 6
Experiment 4
LONG AFFERENT LOOP and GASTROJEJUNOSTOMY
Ulcer Dogs 7 & 8
Experiment 5
SHORT AFFERENT LOOP, partial duodenojejunectomy, EFFERENT GASTRODUODENOSTOMY, and restoration of continuity by DUODENOILEOSTOMY
D
Experiment 6
LONG AFFERENT LOOP (interposition of lower jejunoileal segment between afferent duodenum and stomach), partial duodenojejunectomy, EFFERENT GASTRODUODENOSTOMY, and restoration of continuity by DUODENOILEOSTOMY
Ulcer Dog 12
E

Dog No.	Length of Seg. A	Survival period	Cause of death	Ulcer at autopsy	Theoretic secretin produc.
1	8 cm.	72 da.	Sacrif.	No	Good
2	9 cm.	88 da.	Sacrif.	No	Good

Dog No.	Length of Seg. A + Seg. C	Survival period	Cause of death	Ulcer at autopsy	Theoretic secretin produc.
3	85 cm.	150 da.	Perit.	Yes	Good
4	85 cm.	185 da.	Sacrif.	No	Good

Dog No.	Length of Seg. A	Length of Exc. seg. B	Survival period	Cause of death	Ulcer at autopsy	Theoretic secretin produc.
5	10 cm.	75 cm.	81 da.	Sacrif.	No	Poor
6	8 cm.	75 cm.	77 da.	Obs. ulc.	Yes	Poor

Dog No.	Length of Seg. A	Survival period	Cause of death	Ulcer at autopsy	Theoretic secretin produc.
7	75 cm.	150 da.	Perf. ulc.	Yes	Poor
8	90 cm.	55 da.	Perf. ulc.	Yes	Poor

Dog No.	Length of Seg. A	Length of Seg. B	Length of Exc. seg. C	Survival period	Cause of death	Ulcer at autopsy	Theoretic secretin produc.
9	12 cm.	7.5 cm.	135 cm.	85 da.	Sacrif.	No	Satis., ?
10	7 cm.	4 cm.	135 cm.	93 da.	Sacrif.	No	Satis., ?

Dog No.	Length of Seg. A+D	Length of Seg. B	Length of Exc. seg. C	Survival period	Cause of death	Ulcer at autopsy	Theoretic secretin produc.
11	90 cm.	12 cm.	60 cm.	81 da.	Sacrif.	No	Good
12	90 cm.	3 cm.	60 cm.	75 da.	Perf. ulc.	Yes	Satis., ?

Fig. 4.—Types of operation performed in an attempt to separate out the relative importance of the secretin "distance" and "sensitivity" factors in the rôle of the long afferent loop in the production of stomal ulcer in the Billroth II type of gastric resection.

In 6 dogs in which the spatial factor was satisfactory (short afferent duodenal loop), stomal ulcer occurred only once (16.2%). In 4 of 6 dogs, in which the spatial factor was unsatisfactory (long proximal loop) stomal ulcer occurred 4 times (66.6%).

In 8 dogs the gastric outlet emptied over duodenal mucosa. Stomal ulcer occurred twice (25%). In 4 dogs, the gastric outlet met jejunal mucosa. Stomal ulcer occurred 3 times (75%).

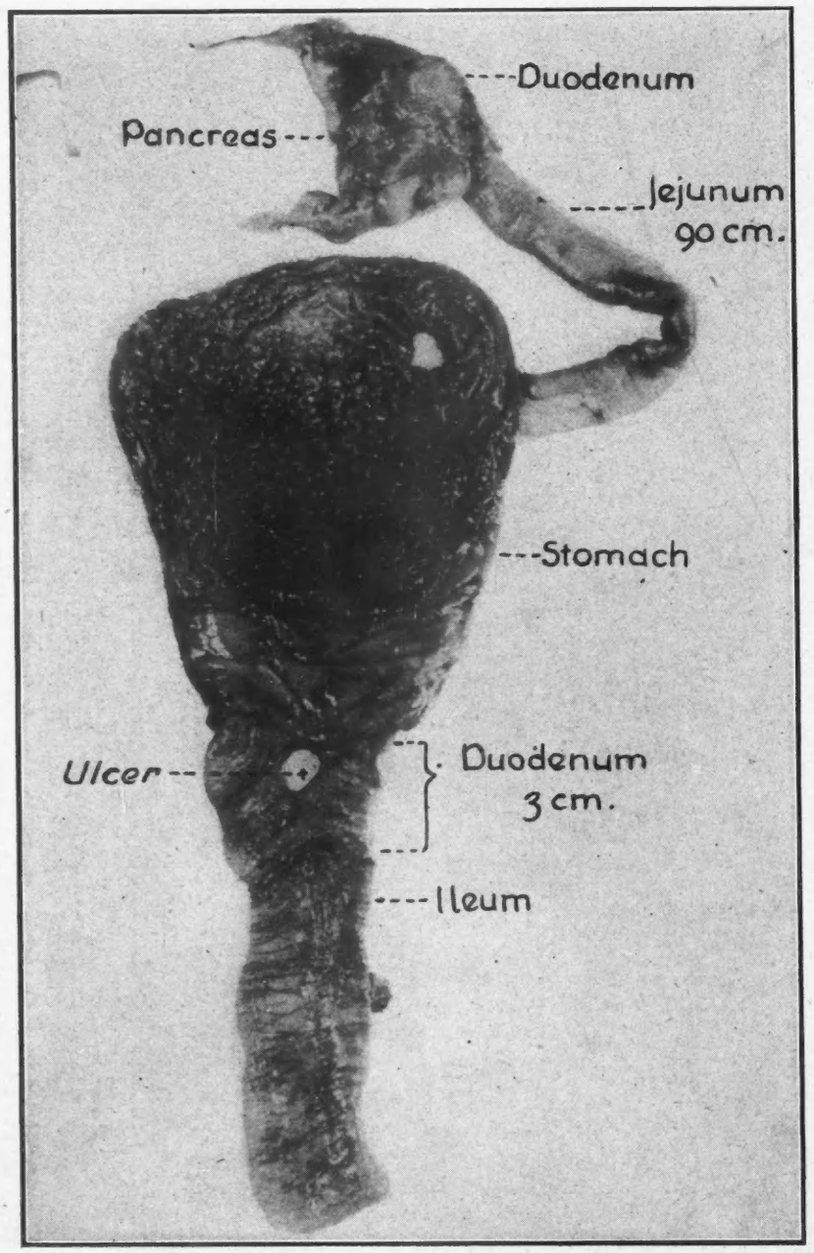


Fig. 5.—Spontaneous perforation of stomal ulcer in dog 12 (Experiment 6, Fig. 4). The afferent loop was 90 cm. in length, the stomal ulcer occurred in the duodenal segment. The "distance" as well as the "secretin" factors were both poor in this experiment. The sensitivity factor was good; in other words, one might reasonably have expected the ulcer to skip the 3 cm. duodenal segment and to have occurred in the ileum just beyond, if the ileal mucosa is more sensitive than the duodenal to corrosion by gastric juice.

Comment.—It is apparent from this analysis that, it is difficult to separate out the eventual rôle of any single factor. That is especially true of the secretin and distance factors. Experiments 10 and 12 constitute an excellent example of the difficulty (see Fig. 4). In dog No. 10, the afferent loop was short; in dog No. 12 it was long. In dog No. 10, only 4 cm. of duodenal mucosa remained at the efferent outlet for the gastric secretions to glide over in provoking the usual secretin effect; in dog No. 12, only 3 cm. of duodenal mucosa remained at the efferent gastric outlet. Spontaneous perforation of a stomal ulcer killed dog No. 12; 75 days after the operation no ulcer was present in dog No. 10, when he was sacrificed at 53 days. In dog No. 10, however, with the short afferent loop (7 cm.) containing good secretin containing duodenal mucosa, regurgitation of gastric secretions into the short afferent loop may have sufficed to augment the secretin effect of the 4 cm. duodenal mucosal segment at the efferent gastric outlet. In dog No. 12, on the contrary, retrograde regurgitation of gastric secretions into the long 90 cm. afferent loop could not reach the rich secretin bearing area of the duodenal segment. This same dog, No. 12, provides a striking lesson in another respect. The stomal ulcer occurred in the short (3 cm.) duodenal segment at the efferent gastric outlet and not in the ileal mucosa just beyond (Fig. 5).

In this group of experiments stomal ulcer occurred only once in a dog with a short afferent loop (dog No. 6); in this instance, however, stenosis of the afferent inlet stoma was present, interfering with delivery of the alkaline secretions from the duodenal loop. Moreover, in long afferent loops, in which extraneous factors might influence the

motility of the segment and hence delivery of the content of the loop, it would appear that such long afferent loops invite stomal ulcer.

A larger number of experiments in each group would undoubtedly be helpful in resolving the importance of each of the factors scrutinized in this study. In addition, the animals not dying of spontaneous perforation of a stomal ulcer should be allowed to survive longer before sacrifice. It is not unlikely that employment of additional modes of attack may help to separate out more definitely, the component important parts in the predisposition of stomal ulcer presented by the long afferent duodenojejunal loop. Three such methods are now being applied to the problem in this laboratory: (1) assaying the secretin potency of intestinal mucosa from varying levels of the bowel in both dog and man; (2) determination of the loss in titratable alkalinity, if any, of the content of the long afferent duodenojejunal loop as delivered at the afferent gastrojejunal stoma; (3) experiments in which the sensitivity of the mucosa of various segments of the intestine is examined by allowing hydrochloric acid to drip upon isolated surfaces.

It is difficult to separate out with finality the rôle of the various factors contributing to the development of stomal ulcer attending employment of a long afferent loop in the operation of complete intragastric drainage of the content of the duodenal loop. The "secretin" factor can not be divorced completely from the considerations of the "distance" factor. Experiment No. 12 (Fig. 4) suggests rather definitely that, the "sensitivity" factor is not as important as the other two.

The evidence garnered in this study lends strong confirmation to the deductions arrived at in the two studies listed under A and B indicating that, a long afferent duodenojejunal loop invites stomal ulcer in any gastric operation carried out on the Billroth II plan of procedure.

D. *The clinical aspects of the problem of the length of the afferent loop in gastric resection for ulcer.* — The experimental data described above under captions A, B and C suggest definitely that, the antecolic anastomosis with a long proximal duodenojejunal loop, even when accompanied by an extensive gastric resection, is not a satisfactory operation for ulcer in man. Man's small intestine is approximately twice the length of the small intestine in the dog. The length of the duodenum in man is stated by anatomists to vary between 25 and 30 cm. It has been common practice for some gastric surgeons to make the anastomosis 30 (Balfour, 1935) or more (Lahey, 1939) cm. beyond the suspensory duodenojejunal ligament of Treitz. Kiefer (1942) has reported a series of 173 extensive gastric resections for duodenal ulcer in which the incidence of gastrojejunal ulcer was 11.4%, posited on recurrence verified at operation, roentgen demonstration of a crater or the occurrence of bleeding. In that series the antecolic long proximal duodenojejunal loop was employed in the anastomosis.

In this clinic, a series of patients comprising now more than 400 consecutive gastric resections all carefully followed, has been operated upon for ulcer, employing the criteria of a satisfactory operation for ulcer described herein. In this group only one stomal ulcer has developed thus far. In that patient, Mr. L.B., aged 50, an antecedent gastrojejunostomy had been done elsewhere for a duodenal ulcer. At the operation performed by me on May 5, 1944, for a gastrojejunal ulcer, only 155 gm. of tissue were removed including 6 cm. of jejunum. In the usual three-quarter (75%) resection for ulcer, the removal of 185 gm. or more is ordinary. In the re-operation done on May 2, 1945, 86 additional grams of stomach were removed suggesting that, at the first operation, the site of the resection was inadequate. A 75% gastric resection, employing a short afferent duodenojejunal loop with a retrocolic anastomosis made at or just proximal to the suspensory duodenojejunal ligament of Treitz has been standard practice in operating upon patients for ulcer in this clinic for several years.

E. *Would a less extent of excision suffice to protect against the histamine provoked ulcer if gastric resection is carried out on the Billroth I plan of operation?*[2]—Inasmuch as the short afferent duodenojejunal loop is so important in a satisfactory operation for ulcer, would it be equally satisfactory to sacrifice less stomach (25 or 50%), but to effect gastrointestinal continuity by end-to-end suture between the stomach and the duodenum by the Billroth I operation? Experiments were carried out on 12 dogs in three series to attempt to answer this question. Each series had a different amount of stomach resected, but the residual gastric pouch in each dog in all series was anastomosed to the duo-

denum just beyond the inverted duodenal end by means of an end-to-side gastroduodenostomy. This procedure, known as the Billroth I (Haberer-Finney) plan of operation is technically more feasible in the dog than the straightforward Billroth I operation which requires an end-to-end gastroduodenostomy. After an interval averaging 46 days, the administration of 30 mgm. of the histamine-in-beeswax mixture, prepared after the method of Code and Varco (1940) was injected intramuscularly daily. Unless the dogs succumbed from the complications of ulcer invoked by the histamine implantation, the injections were carried out for 45 days.

Results: *Series I.*—Four dogs were used. A 25% gastric resection and gastroduodenostomy was performed at the inverted duodenal end. After a sufficient recovery period from the operation, the daily administration of the histamine-in-beeswax mixture was begun. Three of the four dogs (75%) developed a stomal ulcer.

Series II.—The identical procedure was used on four dogs in this series with one difference: a 50% gastric resection was carried out, followed after a suitable interval by the administration of histamine. Stomal ulcer occurred in 3 of the 4 dogs (75%).

Series III.—In this series a three-quarter gastric resection (75%) was done, followed subsequently by the administration of histamine. Stomal ulcer did not occur.

These experiments would suggest that a 75% resection carried out on the Billroth II plan of operation, employing a short afferent duodenojejunal loop, the anastomosis being made at the suspensory duodenal ligament of Treitz, is just as satisfactory an operation for ulcer as is the Billroth I operation.

F. *Intractable or incurable recurrent ulcer a myth.*—The success with which the three-quarter (75%) resection has been carried out in the surgical management of ulcer suggests that a satisfactory operation has been found. It is to be admitted freely, however, that excision of 75% of the stomach is not an ideal therapeutic measure. It is to be hoped that some day the

Fig. 6a.—Perforated stomal ulcer in a dog after a 25% gastric resection on the Billroth I operation. The dog died 17 days after the daily administration of 30 mgm. of histamine-in-beeswax was commenced. **Fig. 6b.**—Large perforating stomal ulcer in a dog in which a 50% Billroth I resection was done. The dog was sacrificed 45 days after the administration of histamine was started.

same objective may be achieved by lesser means. The mortality of the procedure in the experience of this clinic is approximately 2% in gastric resections of election. The surgical mortality of all procedures for ulcer including perforation and hæmorrhage has been 5%. Over a period of more than four years, during which we have been assaying the capacity of various operations to protect against the histamine-provoked ulcer in the laboratory, we have found the Group III operation (75% resection), herein described, uniformly resistant to ulcer ordinarily provoked by histamine. In the single instance in which stomal ulcer has been observed to follow such a resection in a patient, an inadequate operation was done. Whereas caffeine and alcohol are anathema to the patient with an ulcer, we have observed no need to enjoin dietary strictures upon patients who have undergone the type of procedure described herein.

Rienhoff (1945) in a recent paper replete with beautiful illustrations advocates return to a "conservative" gastric resection for duodenal ulcer, carrying the excision proximally to include the incisura angularis of the stomach. Rienhoff appends several tables in which he analyzes his data carefully. His Table III is particularly instructive. Of 260 patients operated upon by Rienhoff, he has found it necessary to subject 29 of the 255 that survived operation to re-operation, an incidence of 11.3%. If hæmorrhage is counted as synonymous with recurrent ulcer, 21.1% of the survivors have gastrojejunal ulcer. In addition, 16.3% of the survivors complain of pain. Obviously, Rienhoff's own analysis of the results of his operation may be employed to suggest that the conservative resection is an inadequate operation for ulcer. Our own observations suggest that it is not necessary to excise the ulcer itself in difficult duodenal ulcers to prevent ulcer recurrence.

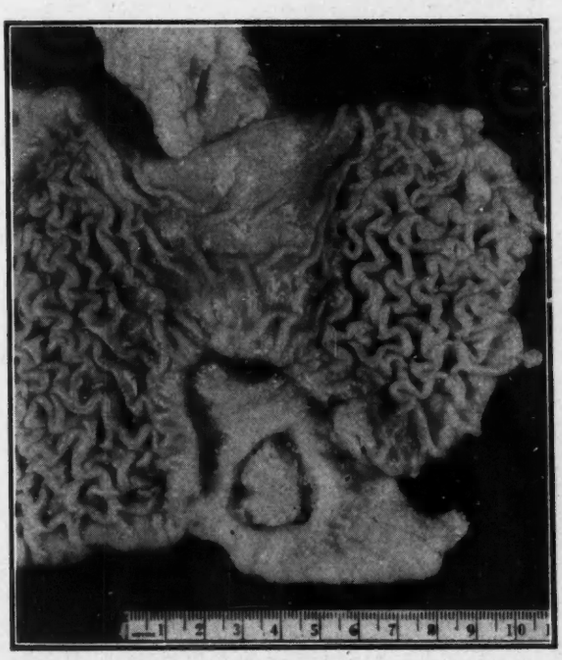


Fig. 6c.—Perforating stomal ulcer in a dog after Billroth II resection (33%); the dog was moribund from hæmorrhage 35 days after the administration of histamine was started.

We have been unable to produce stomal ulcer in the dog with histamine after a three-quarter resection (75%) whether carried out on the Billroth I or II plan of operation.

It perhaps is not out of place to point out too that the Billroth II plan of operation abets the ulcer diathesis.[67] Spontaneous ulcer in dogs is virtually unknown or, at any rate, is a great rarity. When, however, gastrojejunostomy is established in dogs, an incidence of gastrojejunal ulcer is observed in 6.6% (Montgomery, 1923). If, in addition, pyloric exclusion is performed, gastrojejunal ulcer occurs in dogs in approximately 50% of instances (McMaster, 1934; De-Bakey, 1937), indicating definitely that the Billroth II plan of operation abets the ulcer diathesis. As a matter of fact, Eiselsberg (1895) who devised the procedure of combining gastrojejunostomy with pyloric exclusion, did it on the basis of affording complete rest to a duodenal ulcer. Within a very few years thereafter, however, he observed that the high incidence of gastrojejunal ulcer following this procedure (37.5%) warranted its discontinuance. Wherein does the explanation of the increased susceptibility to gastrojejunal ulcer lie following performance of gastrojejunostomy combined with pyloric exclusion? I am inclined to believe it resides in this, that the exclusion of acid gastric juice from the duodenum prevents normal operation of the hormonal secretin mechanism described by Bayliss and Starling (1902). In other words, the small gastric resection is no better and probably inferior to gastrojejunostomy, which also is a poor operation with which to combat the ulcer diathesis.

G. *Implantation of a pedicled jejunal patch on to the gastric wall.*—Andrus and his associates (1943) contend that a jejunal graft transposed to the gastric wall will depress gastric secretion and have employed this procedure in the therapy of ulcer in man. Grossman and his associates (1945) from Ivy's laboratory, and Kolouch and associates (1945) from our labora-

tory failed to obtain confirmation of Andrus' contention.

H. *Supradiaphragmatic vagotomy.* — Dragstedt and Schaefer (1945) report having performed supradiaphragmatic section of both vagi nerves in 14 patients with ulcer with striking improvement. Many of the patients have been relieved completely of their symptoms. In 3, however, a subsequent gastrojejunostomy became necessary for the relief of persistent obstruction. We are now trying to determine whether vagotomy carried out in this manner in dogs will protect against the histamine provoked ulcer.* It is to be remembered that whereas vagotomy ablates the cephalic phase of gastric secretion, vagotomy has been employed to produce ulcer experimentally. In his Balfour lecture at Toronto, Cushing (1932) considered the neurogenic factor and its relation to the ulcer problem at length.

CONCLUSIONS

The clinical observations and experiments reported herein appear to justify the following conclusions:

1. The ease of production of perforating gastric and/or duodenal ulcer in most laboratory animals by the implantation of histamine-in-beeswax emphasizes the great importance of the acid-peptic digestive activity of the gastric juice in ulcer genesis.

2. It is obvious that fat embolism may occur following fracture of long bones and plug the end-vessels of the gastric mucosa and produce erosions, and/or ulcer, which in turn in the presence of active gastric secretion, may result in bleeding, hæmatemesis and/or melæna. This occurrence has been observed clinically and its counterpart has been produced experimentally.

3. The production of severe bleeding from erosions and/or ulcer, attending the administration of vasospastic agents such as epinephrine or pitressin accompanied by histamine-in-beeswax, definitely suggests the important rôle of the ischæmia resulting from an over-active vasomotor influence in ulcer genesis, when attended by active gastric secretion.

4. Partial obstruction to the venous outflow from the stomach increases the weight of the stomach, traceable to resultant œdema of the gastric wall, especially of the submucosa. Such venous obstruction abets the ulcer diathesis. Bleeding gastric and/or duodenal erosions and/or ulcers, as well as erosions of the lower end of the œsophagus, may be produced by such obstructions.

It is suggested that, the threatening bleeding of portal vein obstruction may be corrected by an operation (90% gastric resection) which reduces materially the capacity of the stomach to secrete. Case records of 4 patients in which this procedure has been carried out are cited. Moreover, it is suggested that, occult hæmorrhage from the alimentary canal frequently has its origin in the stomach and that, gastric resection is indicated as a therapeutic measure in many such instances. The case records of 4 patients in which this procedure was carried out successfully for profound occult anæmia are cited.

5. The histamine-in-beeswax technique has proved a useful instrument in appraising the characterization of a satisfactory operation for ulcer. It would appear that a three-quarter resection (75%), carried out on the Billroth II plan of operation, employing a short afferent duodenal loop in which the antral mucosa and the lesser curvature of the stomach are excised, meets the requirements of a satisfactory operation for ulcer. Our experience with this procedure in patients as well as in dogs receiving histamine would suggest that the intractable ulcer may be a myth.

* Experiments completed since this presentation indicate definitely that, in the dog and even in the rabbit, vagotomy affords no protection against the histamine-provoked ulcer.

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REVIEW OF FRACTURES AND DISLOCATIONS OF THE CARPUS

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ONE hundred and ninety-two cases of fractures or dislocations involving the carpus, were observed amongst approximately 9,500 patients, seen at this Orthopædic Unit between 1942 and 1944. Ten per cent of the cases referred with injuries to the distal one-third of the radius, were suffering from coincidental lesions of the carpus. Amongst 331 successive fractures of the radius and ulna, at all levels, 7% had carpal injuries.

All patients seen, following injuries to the carpal region, were examined clinically and radiologically. Antero-posterior, lateral and oblique views were requested as a routine. Fig. 1 is an instance. If no pathological condition was found on radiological examination, but the clinical findings were conclusive of a fractured scaphoid, plaster was applied, and radiological examination repeated at three weeks for verification of fracture.

The distribution of the traumatic lesions encountered is indicated in Table I.

TABLE I.

A. Fractures

1. Scaphoid	145
2. Triquetrum	11
3. Trapezium	4
4. Capitate	3
5. Lunate	2
6. Pisiform	1
7. Trapezoid	1
8. Multiple	8
	175

B. Dislocations

1. Anterior lunate	4
2. Retro-lunar	2
3. Retro-lunar scaphoid	1
4. Hamate, pisiform and triquetrum.	1
	8

C. Fracture dislocations

1. Retro-lunar scaphoid	2
2. Pre-lunar scaphoid	2
3. Retro-lunar triquetrum	2
4. Mid-carpal	3
	9

Of a series of 145 fractures of the scaphoid, 47 were seen within five days of injury. These were treated by immediate immobilization in plaster of Paris as shown in Fig. 4. The plaster was skin-tight, comfortable and durable, extending to the base of the thumb-nail, and was moulded so as to fix the wrist in slight dorsiflexion, and radial deviation, with the thumb in moderate abduction and opposition. This type of plaster allowed full flexion of the elbow, full movement of the fingers, and considerable use of the hand. Where possible, Service patients returned to their units for suitable duties. They were instructed to report to the out-patient department within three or four weeks of injury, and thereafter at six to eight week intervals. The presence of pain, looseness or breakage of plaster, was an indication for immediate return. Active finger and elbow movements were begun twenty-four hours after the commencement of treatment. Scaphoid plasters were removed with minimal disturbance to the fracture by bi-valving along the stippled lines (Fig. 4a).

Of 47 cases seen within five days of injury, 43 had fractures involving the waist or proximal pole of the scaphoid. In three cases the fracture was bi-lateral. Twenty-five of these were followed to the end of treatment. Immediate and uninterrupted plaster immobilization resulted in union in every case. The time for union varied from five and a half to 25 weeks, and averaged 13½ weeks. Final follow-up was not available in 18 of the remaining cases, but 10 of these were known to be making satisfactory progress towards union. Four recent fractures of the scaphoid tubercle were treated in a similar manner. The average time for union was 9 weeks. Union was considered present when there was no local pain or tenderness, and the fracture line was no longer visible in any radiological plane.

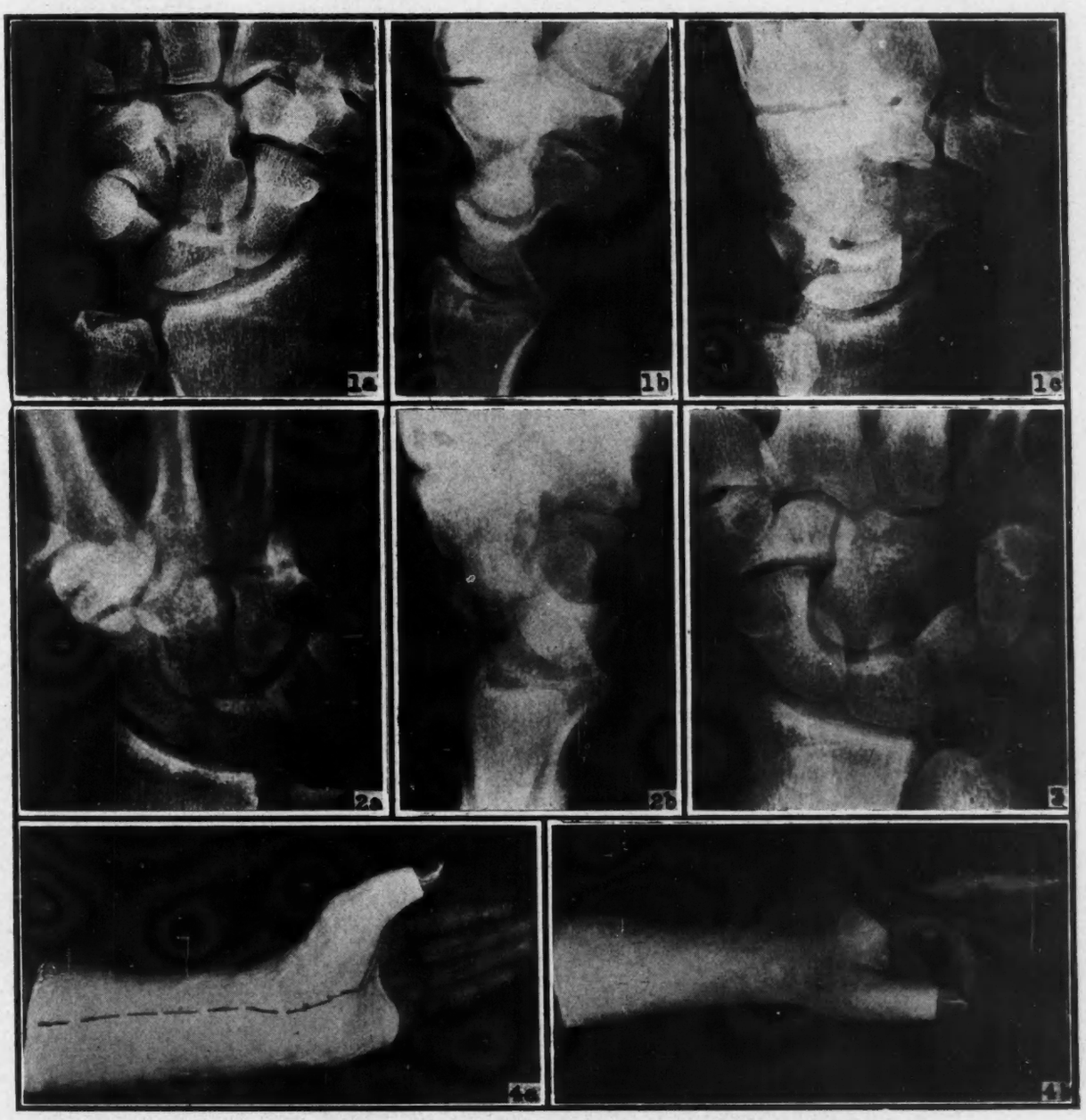
Twenty-seven cases of fracture through the waist, or proximal pole of the scaphoid, were seen between 5 days and 6 months from injury, and treated by plaster immobilization until union was evident. All but one of these terminated in union, without operative measures. The duration of immobilization necessary, however, varied directly as the interval between injury and commencement of treatment, as shown in Table II.

An additional group of 57 cases of fracture of the waist or proximal pole of the scaphoid was seen in the out-patient department for opinion, at various stages of treatment. Many of these patients were in transit, or under treatment

TABLE II.

Interval between injury and commencement of immobilization	*Time of union from commencement of immobilization (average)*	*No. of cases*
Less than 5 days	13½ weeks	25
5 to 10 days	16 "	9
10 days to 1 month	22 "	3
1 to 3 months	22 "	11
3 to 6 months	31 "	4
6 months to 12 years	(Non-union with pseudarthrosis in 12; 2 united after 16 and 25 weeks)	14
		66

elsewhere, and accurate follow-ups were not available. Fractures of the scaphoid were usually demonstrated by roentgenogram at the first examination. On six occasions, radiological confirmation was not obtained until the repeat examination three weeks after injury. In these cases, the clinical findings were conclusive at the initial examination, and scaphoid plasters had been applied. In 3 of the 43 recent cases, fractures through the waist were visible on the oblique, but not on the antero-posterior or



Example of failure to detect fracture except with oblique view:

Fig. 1a.—Antero-posterior of wrist. **Fig. 1b.**—Lateral of wrist. **Fig. 1c.**—Oblique view showing fracture of wrist. **Fig. 2a.**—Antero-posterior of wrist with retro-scapho-lunar dislocation. **Fig. 2b.**—Lateral of wrist with retro-scapho-lunar dislocation. **Fig. 3.**—Separation of the hamate and capitate with interposition of the triquetrum. **Fig. 4a.**—Scaphoid plaster. **Fig. 4b.**—Scaphoid plaster.

lateral radiograms. Only one bi-partite scaphoid was seen.

Minor degrees of displacement of the fragments were not unusual. Attempts to correct these deformities were successful often in the group seen under 5 days, but seldom satisfactory in those seen after ten days. Unreduced displacement appeared to delay union. Comminution of the scaphoid, without injury to the adjacent bones, was present on three occasions. Of these, two united early in plaster with good results, but the third developed local arthritis requiring excision of the scaphoid.

Sixteen patients were regarded as suitable candidates for operative treatment. In two, the proximal fragment of the scaphoid was excised for avascular necrosis, with subsequent slight weakness occurring in each case. The functional result was good in one case and only fair in the other. One scaphoid with delayed union, and no arthritic change, was satisfactorily treated by drilling. Total excision of the scaphoid was done in five cases of ununited fracture, where there was considerable pain and arthritis localized in the scaphoid area. The results were very good in one case; indifferent in three, with weakness and persistent pain; definitely poor in the fifth. A bone-grafting operation was performed on three patients in whom the scaphoid had failed to unite, despite prolonged immobilization, and where no arthritic change was evident. Four patients with advanced arthritis and considerable pain obtained excellent results from arthrodesis of the wrist joint.

The presence of arthritic change was not usually detected on roentgenograms before three months from the time of injury. Service patients with slight arthritis and delayed union were treated by plaster immobilization. All of these returned to duty, although many of them had to be recategorized. Twelve patients with old ununited fractures and pseudarthrosis came under observation. Most of these reported because of an exacerbation of symptoms following recent trauma. The disability was considered to be due to the lighting up of arthritic changes following on the original injury. Plaster immobilization for a few weeks usually gave partial relief from pain, and enabled these men to continue on duty.

The second commonest fractures of the carpus were those involving the triquetrum. Eleven of these were encountered. One was an old ununited fracture with minimal pain, requiring no treatment. The remaining 10 were recent fractures and were treated by a Colles type of plaster. In the 8 cases which were followed to the completion of treatment, the average time for union was 5 weeks, with good functional result.

Of four recent fractures of the trapezium, 3 were followed to the end of treatment, in scaphoid plaster, and with an average time for union of 5 weeks.

Three recent fractures of the capitate were encountered. Of these, 2 were avulsion fractures of the dorsal surface, following "sprains" of the wrist. Cock-up plasters were applied for three weeks with satisfactory results. A third was an ununited fracture with local pain of slight degree.

Two fractures of the lunate were successfully treated by the application of a Colles type of plaster for three weeks.

Single cases of fractures of the hamate, pisiform and trapezoid were treated by cock-up plasters for three weeks. No sequelæ occurred.

In the three year period, there were eight patients with multiple fractures of the carpus. Of these, three had extensive comminution of the carpus and distal end of the radius, with subsequent arthritis and fibrous ankylosis. One developed Sudeck's atrophy which failed to respond to treatment.

Dislocations of the lunate bone occurred with greater frequency than any other dislocation of the carpus. Two cases with a simple anterior dislocation of the lunate, were reduced by traction and manipulation. In one of five weeks' duration, the lunate was excised through an anterior approach, resulting in slight pain and weakness of the wrist. One old unreduced anterior dislocation was untreated because of irregular discharge from hospital. Median nerve lesions were present in two dislocations, with spontaneous recovery occurring in one case after two days from injury, in the other, after nine weeks.

Retro-lunar dislocations of the carpus were two in number, and, following the usual manipulative reduction, developed good function after 3 weeks in plaster. Fig. 2 is a retro-scapholunar dislocation which was reduced by traction, with return of normal function. A very unusual dislocation of the hamate and capitate,

with interposition of triquetrum between these displaced bones, is illustrated in Fig. 3. One mid-carpal dislocation was encountered and treated with satisfactory results.

Dislocation of the semi-lunar bone may occur in combination with other carpal injuries. Four patients were admitted with fractures of the scaphoid waist, and dislocation of the distal fragment and remainder of the carpus, in relation to the proximal fragment and lunate which remained in their normal positions. Two of these were pre-scapho-lunar, and two post-scapho-lunar fracture dislocations. One was not a true fracture dislocation in that the scaphoid was bi-partite, and the dislocation occurred at the congenital defect. Despite good anatomical reduction, the results in all four cases were disappointing. These men returned to duty in lower categories. One case of fracture dislocation, with congenital fusion of the triquetrum and lunate was reported elsewhere.[1]

In three instances, severe fractures of the distal row of the carpus were associated with mid-carpal, and carpo-metacarpal subluxations. Imperfect reductions were obtained by manipulation, with subsequent ankylosis at the mid-carpal joint. The functional results, however, were good.

SUMMARY

1. The frequency of carpal injuries associated with fractures of the radius and ulna has been reported.

2. The efficacy of immediate and uninterrupted plaster immobilization of recent fractures, has been demonstrated.

3. Some features in the diagnosis of scaphoid fractures have been reviewed.

4. Sixteen, in a series of 145 fractures of the scaphoid, were treated by operative measures.

5. A few unusual fractures and dislocations have been recorded.

6. Eighteen cases with closed traumatic lesions of the carpus, under treatment at the present time, have not been reviewed.

We are indebted to Lloyd M. Hampson, M.D., for assistance in the preparation of this paper.

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SUBACUTE NEUTROPENIA TREATED BY SPLENECTOMY*

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AMONG the physiological functions of the normal spleen, the phagocytic activity of its reticulo-endothelial cells for bacteria, foreign particulate matter, thrombocytes, red cells and leucocytes has long been recognized. There are also a few well defined splenic diseases already described, as for instance essential thrombocytopenic purpura and congenital hæmolytic icterus, in which this phagocytosis is abnormally enhanced.

In 1939, Wiseman and Doan reported three cases of neutropenia successfully treated by splenectomy. The presence of numerous clasmatocytes containing engulfed granulocytes in the splenic scrapings was held as convincing evidence of an abnormal splenic phagocytosis. In 1942,[10] these authors extended their observations on the same cases to show that no relapse had occurred during the intervening period and reported two new cases. They suggested the term "essential or primary splenic neutropenia" for this newly recognized syndrome characterized by marked neutropenia and splenomegaly and, since varying degrees and combinations of hæmolytic anæmia and thrombocytopenia were present and coincidentally corrected by splenectomy in their five cases, they insisted upon the close relationship of their syndrome to hæmolytic icterus and essential thrombocytopenic purpura.

This granulocytopenic syndrome was confirmed by Moore and Bierbaum,[6] who reported another case in 1939. Splenectomy was also followed by an immediate and permanent rise to a normal level of the leucocytes in the blood stream. A study of histological sections of the removed spleen showed numerous macrophages with ingested leucocytes.

Muether *et al.*[7] gave a detailed report in 1941, of an additional case of granulocytopenia due to an excessive splenic lysis of neutrophils. In this case, however, phagocytosis of polymorphonuclear leucocytes in the spleen could not be demonstrated, but the splenic parenchyma con-

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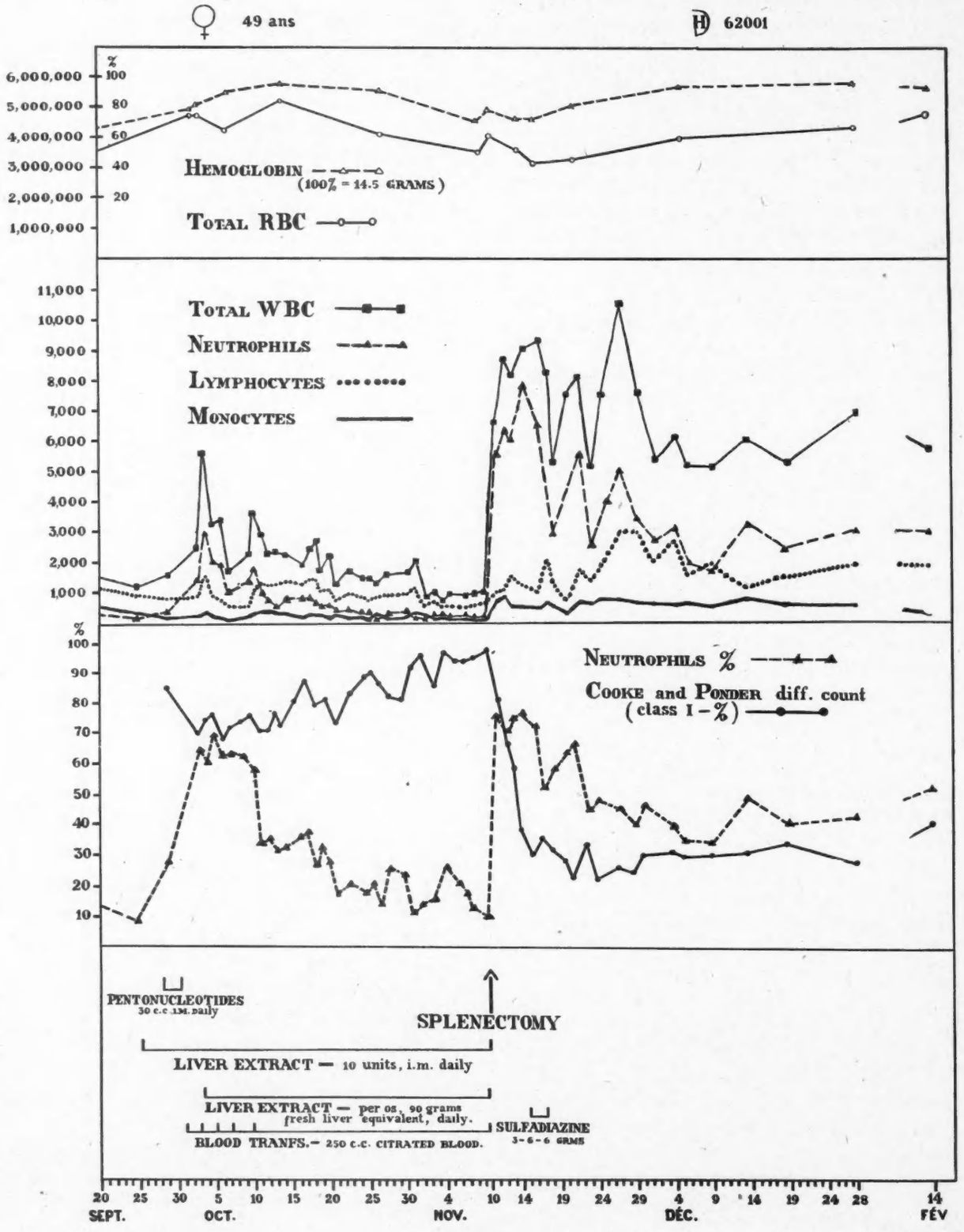
♀ 49 ans
H 62001
HEMOGLOBIN (100% = 14.5 GRAMS)
TOTAL RBC
TOTAL WBC
NEUTROPHILS
LYMPHOCYTES
MONOCYTES
NEUTROPHILS %
COOKE and PONDER diff. count (class I - %)
PENTONUCLEOTIDES 30 c.c. I.M. daily
SPLENECTOMY
LIVER EXTRACT — 10 units, i.m. daily
LIVER EXTRACT — per os, 90 grams fresh liver equivalent, daily.
BLOOD TRANFS.— 250 c.c. CITRATED BLOOD.
SULFADIAZINE 3-6-6 GRMS
SEPT. OCT. NOV. DÉC. FÉV

Chart 1

tained a great number of free granulocytes in different stages of degeneration. This different aspect may be explained by the fact that splenectomy was performed during a period when the neutropenia was not particularly pronounced.

This paper deals with an eighth case of neutropenia, which regressed after splenectomy.

CASE REPORT

J.B., white female, 49 years of age.

Medical history.—The patient had been in normal health until the middle of August, 1944, when she noticed the existence of a progressively enlarging tumour, in the left upper quadrant of the abdomen. Six days prior to her admission to the hospital, on September 19, the patient suffered violent abdominal pains. These pains awakened her during the night and persisted for four days, but varied in intensity. They were accompanied by a slight fever and on two occasions by the evacuation of a few diarrhœic stools. She consulted her family physician, who prescribed sulfathiazole and opium, camphor and tannin tablets. She took about two grams of sulfathiazole; the diarrhœa and the abdominal pains ceased, but the temperature persisted.

On admission to the hospital the chief complaints were: the presence of a heavy tumour in the upper left abdomen, slight tenderness and dull, non-radiating pains in the same region, fever and a progressive general weakness and fatigue.

The systemic history was essentially negative and the hereditary and family histories were void. She had measles at an early age and from 1937 to 1940 presented recurrent painful swellings of most of the joints of both hands. This could be easily characterized as rheumatoid arthritis. In the preceding January, there had been an operation for traumatic fracture of the coccyx. The patient was the mother of thirteen children and had ceased menstruating three months ago.

Physical examination.—At the time of admission, the patient preferred to lie in bed. She was more or less co-operative and showed a certain degree of exhaustion. Her weight was 128 pounds, a few pounds under what she considered normal. The oral temperature was 103° F. and the pulse 96. There was a slight pallor of the skin and mucous membranes. The pharynx, on the other hand, was reddened and covered by a catarrhal exudate, but no ulcerative lesions were present.

At the base of the left lung, the murmur was noticeably decreased and the movements of the left diaphragm were slightly impaired.

The abdominal wall was soft and flabby. The liver and kidneys were not palpable. In the left upper quadrant there was a large mass with a sharp internal edge. This mass descended to the level of the umbilicus, presented a lumbar contact and did not follow the diaphragmatic movements. Palpation occasioned some pain. The tentative diagnosis was that of an enlarged spleen of undetermined origin.

All the joints of the fingers were more or less hypertrophied and nodular. The fingers were slightly bent and crooked and complete extension could not be obtained.

Roentgenograms of the abdomen and the urinary tract confirmed the existence of a large spleen, which compressed the left kidney in the costo-vertebral corner. The left renal pelvis was distended and the proximal end of the ureter distinctly kinked.

Laboratory data. — The hæmatological findings are summarized in Chart 1. At the time of admission there was a low grade anæmia with 3,500,000 red cells and a profound leucopenia with 1,571 leucocytes, of which only 188 were granulocytes. An occasional neutrophil contained toxic granulations and the Cooke and Ponder differential count showed a marked shift to the left. Lymphocytes and monocytes were qualitatively normal. In subsequent blood examinations, reticulocytes were found to be higher than normal: 2.5 and 4.8% (normal: 0.5 to 1.0%) and the thrombocytes lower: 152,070 and 132,830 (normal: 250,000 to 300,000 per c.mm.). Red cell fragility range: 56 to 36 gm. % salt equivalents (normal: 48 to 36 gm. %). Icterus index: 2.7 units (Fiessenger and Walter technique: normal 1.6 to 2 units). Blood coagulation time: 6 min. (capillary tube technique). Bleeding time: 2 min. 45 sec. Urinalysis: normal findings. Kline test: negative.

Widal tests for Eberthella typhosa, Salmonella para. A, Salmonella para. B and Brucella abortus were negative and no bacteria could be isolated from blood culture.

Bone marrow was obtained by sternal puncture on October 6. The differential count, tabulated in Table I, indicated a slightly hyperplastic bone marrow. No pathological cells were found.

TABLE I.

BONE-MARROW DIFFERENTIAL COUNT

Myeloblasts	4.5%
Promyelocytes	8.8%
Myelocytes	
Neutrophil	11.7%
Eosinophil	3.4%
Basophil	0.0%
Metamyelocytes	
Neutrophil	11.0%
Eosinophil	1.1%
Basophil	0.5%
Non-segmented polymorphonuclears (stab)	
Neutrophil	18.0%
Eosinophil	0.5%
Segmented polymorphonuclears	
Neutrophil	2.0%
Eosinophil	0.8%
Erythroblasts	3.0%
Normoblasts	
Basophilic	2.8%
Polychrom	5.7%
Orthochrom	11.7%
Clasmatocytes	4.0%
Megacaryocytes	0.2%
Lymphocytes	4.4%
Monocytes	0.8%
Plasmocytes	0.3%

W.B.C.: R.B.C. ratio 3.2:1.

Clinical course before splenectomy.—During the first two weeks of hospitalization, the patient's oral temperature varied between 102 and 103° F. In the first few days of October, this hyperthermia gradually decreased. On the 6th, the temperature was normal and the patient remained afebrile up to the day of splenectomy. During this period of pyrexia there were frequent chills followed by profuse sweating, severe anorexia, some loss of weight and a progressively alarming state of exhaustion. On one occasion the patient became delirious.

Pentnucleotides, liver extracts and blood transfusions were administered as summarized in Chart 1.

In the middle of October, following five transfusions of citrated blood, the patient's condition had improved. The spleen, after having gradually decreased in volume, finally disappeared behind the costal wall. The red cell count reached 5,260,000 cells, but the total number of leucocytes remained low: 2,071, with only 30% neutrophils (October 14).

An adrenalin test was performed on October 31. After the subcutaneous injection of 1 c.c. of 1:1,000 adrenalin, the red cells rose from 4,260,000 to 5,600,000 and the leucocytes from 2,642 to 8,285. The detailed hæmatological variations obtained during this test are indicated in Charts 2, 3, 4.

At the beginning of November, the spleen became once more palpable and descended approximately 4 cm. below the costal margin. The total number of leucocytes fell to 678 on November 2 and 785 on November 4. The patient's general condition became very serious. She had continued to lose weight and had now lost approximately 25 pounds since her admission.

Splenectomy was suggested and the patient immediately consented.

Operation.—Splenectomy was performed on November 10, by Dr. François Roy and Dr. E. Samson. A few minutes before placing ligatures on the splenic pedicle, ½ c.c. of 1:1,000 adrenalin was injected intramuscularly. After liberating a few fibrous adhesions at the upper part of the anterior aspect of the spleen, the organ was easily removed. The liver appeared normal and there were no signs of portal hypertension.

PATHOLOGY OF THE SPLEEN

Gross.—The spleen weighed 966 grams. All diameters were equally augmented (19.5 x 12.5 x 7.0 cm.) and the normal shape of the organ was conserved. The capsule was moderately thickened and presented evidence of mild chronic perisplenitis in the upper part of the anterior aspect; elsewhere it was normal. Upon section, the parenchyma was firm and of a deep cherry-red colour. Malpighian corpuscles, not exceptionally numerous, could be easily recognized.

Microscopic.—The examination of paraffin sections revealed no great abnormality in the white pulp. The lymphatic nodules were of normal size and only very moderately increased in number. Clear (lymphocytopoietic) centres were not exceedingly numerous and presented only here and there a few mitotic figures. No "reaction centres" were seen.

The Billroth cords and venous sinuses, on the other hand, were more abundant than normal. The former contained many reticulo-endothelial elements of two types: cells of moderate size with relatively little protoplasm and dark staining nuclei and large pale irregular cells with abundant, but indistinctly outlined, protoplasm and poor staining nuclei. A relatively high number of these cells were in mitotic division. Scattered through the red pulp were some red cells, lymphocytes, plasmocytes and eosinophils, occasionally myelocytes.

Many venous sinuses were distended. They were lined with large irregularly shaped pale staining elements, very alike in aspect to the large reticulo-endothelial cells of the red pulp. Some of these cells rested with a broad base on the wall of the sinus. Others were held only by a narrow protoplasmic process and projected far into the lumen. Neighbouring cells were often united with each other through cytoplasmic bridges and thus formed foci of a cellular meshwork replacing the greater part of the lumen. A considerable number of these cells were detached and free, becoming round or oval in shape. The sinuses contained also some red cells, a few lymphocytes and eosinophils and an occasional neutrophil.

The reticulum was found to be normal after silver staining by the Laidlaw technique.

The most outstanding microscopic finding was definite evidence of an exaggerated phagocytic activity of the splenic macrophages (Fig. 1): the large, pale, poorly delimited reticulo-endothelial cells lining the sinuses and those found in large number in the Billroth cords. At medium magnification, five to six of these cells containing still easily recognizable whole polymorphonuclear neutrophils could be seen. In others the ingested granulocytes showed signs of more or less advanced degeneration: the nuclei were either pycnotic or swollen or were broken into two or three very dark minute fragments. The cytoplasmic granulations of the engulfed leucocyte had generally more or less disappeared and in many the cytoplasm was transformed into an amorphous substance, which often showed a great

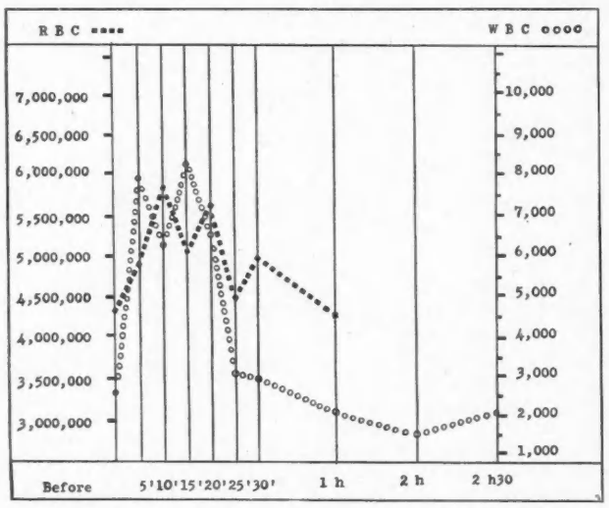

Chart 2.—Adrenalin test: total red blood cell and white blood cell values.

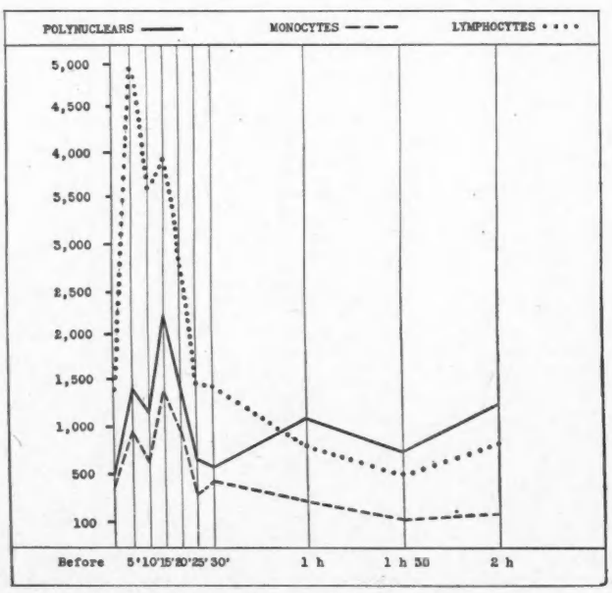

Chart 3.—Adrenalin test: absolute polymorphonuclear, lymphocyte and monocyte values.

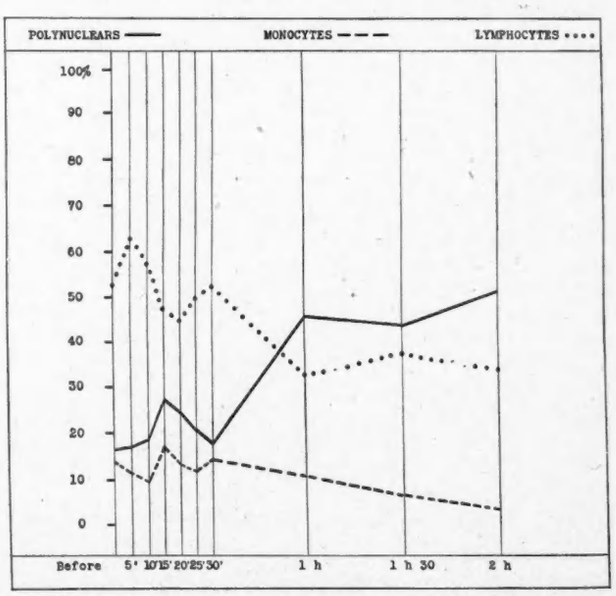

Chart 4. — Adrenalin test: polymorphonuclear, lymphocyte and monocyte percentages.

affinity for eosin. In many macrophages, dark staining particles with clear centres and small eosinophilic globules could be demonstrated. These formations were interpreted as nucleic and cytoplasmic remnants of phagocytized leucocytes.

The phagocytic cells contained also an abnormally high number of red blood corpuscles. In many fields, macrophages with two or three ingested red cells were found. A few contained even side by side red blood corpuscles and granulocytes (Fig. 2). Some of the phagocytized red cells stained very poorly and were in different stages of degeneration. Coarse granules or fine particles of yellow intracellular and extracellular pigment, doubtlessly derived from hæmoglobin, was present in very moderate quantities.

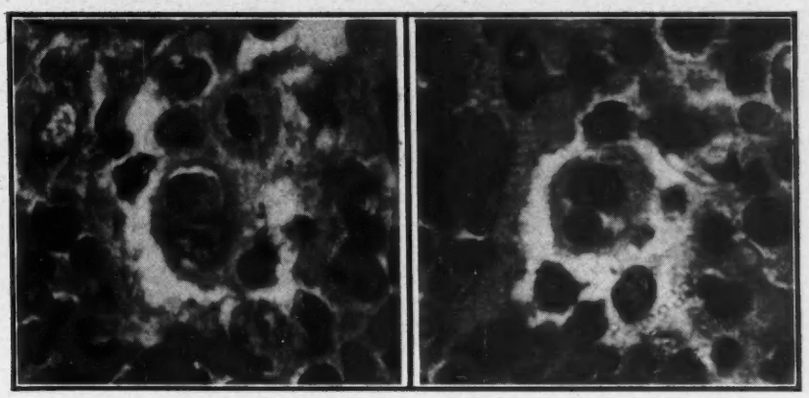

Fig. 1 Fig. 2

Fig. 1.—Distended splenic sinus containing two phagocytozed neutrophils. **Fig. 2.**—Distended splenic sinus; in the centre there is a free macrophage containing a polymorphonuclear and two erythrocytes.

Postoperative course. — A blood count taken 30 minutes after ligation of the splenic pedicle showed that the leucocytes had risen to 4,142. Four hours later they had reached the level of 5,642. As indicated in Chart 1, during the 48 subsequent days of hospitalization, the leucocytes never fell below 5,000 and the Cooke and Ponder PN differential count showed a progressive turn towards normal. There was also a marked rise in the blood platelets with figures as high as 896,400 (November 23) and the percentage of reticulocytes gradually returned to normal, finally reaching 0.3%.

During the first four days following splenectomy the patient's temperature varied between 101.6 and 103° F.; after that it became normal. Fifteen grams of sulfadiazine were given during this period in treatment of a localized pulmonary congestion at the base of the left lung.

The patient improved steadily thereafter. She gained strength and recovered most of her lost weight. The only complaint was intermittent and dull pain in the upper mid-abdomen. This pain disappeared in the fourth postoperative week.

The patient was discharged to her home on December 28. She returned for a check-up 96 days after splenectomy and was found in good health with a leucocyte count of 5,785 and 53% polymorphonuclears.

DISCUSSION

When the patient was admitted to the hospital, a tentative diagnosis of agranulocytosis was made. No signs of infection were present, however, and a thorough inquiry did not reveal that any drugs, amidopyrine in particular, had been taken prior to the onset of the present illness. The patient had taken a few grams of sulfathiazole four or five days before her admission, but at that date she had been complaining of an enlarged spleen for at least a month, her oral temperature was above normal since two days and she had already lost some weight.

Study of the sternal bone marrow did not fit into this preliminary diagnosis either. There was no "maturation arrest" of the myeloid elements as commonly found in malignant agranulocytosis.[3, 4] The differential count, compared with normal values,[8] indicated an hyperplastic bone marrow with mature cells present in sufficient quantities. The percentage of segmented neutrophils in comparison to stab forms, however, was low and approached the ratio of these cells in the peripheral blood.

Splenic contraction obtained by the subcutaneous injection of 1 c.c. of 1:1,000 adrenalin furnished significant findings. As seen in Chart 2, the injection of adrenalin was followed by a rapid and transitory rise in the total red and white blood counts: after 10 minutes, the red blood corpuscles had passed from 4,200,000 to 5,800,000 and after 15 minutes, the leucocytes from 2,500 to 8,250. A blood count made 1 hour after the injection showed that the counts had returned to their initial levels. The curves obtained are twice as high for the red cells and six times higher for the white cells than those recorded in normal individuals.[1]

Even in splenectomized patients adrenalin causes normally, after the initial level has been reached, a second and more permanent rise of the circulating leucocytes.[1] One hour, 30 minutes, 2 hours and 3 hours after an injection, counts of 8,000, 10,000 and 12,000 are regularly obtained. This leucocytosis is generally due to a polynucleosis, following the contraction of other granulocytopoietic tissues: *i.e.*, the bone marrow. A study of the subsequent total leucocyte counts made 1 hour 30 minutes and 2 hours after the adrenalin injection in the present case does not show this second rise of leucocytes (Chart 2). But graphs of the neutrophil, lymphocyte and monocyte absolute values (Chart 3) and especially of their percentages (Chart 4) clearly indicate that this polynucleosis did occur. That it was not evident in the total white cell counts may be explained by the

fact that the momentarily higher output of the bone marrow must have been continually balanced by an exaggerated depletion of neutrophils from the blood stream. The logical hypothesis, made at the time of the test, was that this depletion might be due to an abnormal activity of the patient's enlarged spleen. This organ did contain an abnormally high number of leucocytes, as the height of the first rise of leucocytes due to splenic contraction (Chart 2) clearly indicates.

Splenectomy was followed by a quick and decisive change in the hæmograms. Within four hours the number of white cells per c.mm.[3] was above 5,000 and during the seven postoperative weeks of hospitalization they never fell below this figure. Seven weeks later their number was still 5,785, of which 53% were polymorphonuclears.

A study of the Cooke and Ponder PN differential counts made before and after splenectomy is of considerable interest (Chart 1). Up to the day of operation this count showed a striking shift to the left with from 75 to 97% of the polymorphonuclears in class 1. Following splenectomy the intensity of this shift gradually diminished; for the first time polymorphonuclears with 3 and 4 distinctly lobulated nuclei appeared in the peripheral blood. These findings are in support of the fact that the return of the white cells to a normal level is not to be confounded with the leucocytosis not infrequently found following the removal of even a normally functioning spleen, but is the direct consequence of the disappearance of the depleting factor. The Cooke and Ponder differential count, however, did not return completely to normal and 14 weeks after splenectomy it still read 41-41-14-3-0.

Histological study brought conclusive evidence of an abnormal phagocytic activity of the spleen. An increase in number, in size and in activity of the splenic macrophages was easily demonstrated. There were no fundamentally pathological cells present and no tumoral or inflammatory process could be detected. No nuclear or protoplasmic inclusions were seen.

There is little doubt that our case is a perfect example of the syndrome first described by Wiseman and Doan under the term "Primary or Essential Splenic Neutropenia"[10] and cannot be confused with other neutropenic syndromes such as Banti's disease or Felty's syndrome.[2-5]

The etiology of Wiseman and Doan's syndrome is still unknown. These authors suggest that their syndrome is closely akin to congenital hæmolytic icterus and essential thrombocytopenic purpura and possesses in all probability a comparable mechanism.[10] The accentuation of the physiological function of the spleen in congenital hæmolytic icterus, as stressed by Haden, is a direct response to microspherocytosis, an inherent constitutional defect of the red cells. The primary lesion in thrombocytopenic purpura, where the spleen shows also an exaggerated activity, is still unknown, but may also lie in a basic defect of the platelets. It is impossible to ascertain with which cause the neutropenia in our case may be correlated. The overactive phagocytosis of the spleen may be due to some hereditary or environmental factor or again the spleen simply have removed from the peripheral blood in great numbers effete and fundamentally altered granulocytes. There was no morphological evidence of any alteration in the circulating polymorphonuclears in our case, except the fact that, even after splenectomy up to 14 weeks later, polymorphonuclears with one lobe and two-lobed nuclei were still predominant. The Cooke and Ponder differential counts obtained can be compared to those seen in Pelger-Huët's leucocytic anomaly, where due to an hereditary defect the maturation of neutrophils is arrested in the one or two-lobe stage.[9]

As in Moore and Bierbaum's[6] case, eosinophilia was a constant finding in our patient during her hospitalization. This eosinophilia was always high and was never completely explained. On admission, however, there were no eosinophils present in the routine blood count. They only appeared following liver extract therapy. After splenectomy this eosinophilia persisted for some time, but, when the patient returned for a check-up 14 weeks after operation, their number had considerably decreased. Postoperative eosinophilia is not infrequent after the removal of even a normal functioning spleen.[1]

SUMMARY

An eighth case of "essential or primary splenic neutropenia", a syndrome first described by Wiseman and Doan, is presented.

A pronounced neutropenia and splenomegaly with a low-grade anæmia of the hæmolytic type and a moderate thrombocytopenia, in a woman, 49 years of age, did not regress under standard

therapeutic management. Study of the bone marrow and of the hæmatological variations during splenic contraction obtained by adrenalin indicated that the spleen could be the incriminating factor in this hæmolytopoietic disequilibrium.

Splenectomy was curative. Histological examination demonstrated an increase in the number and in the phagocytic activity of the splenic macrophages. The opinion is expressed that this macrophagic hyperplasia may only constitute a response to some still undetermined alteration of the circulating granulocytes.

We wish to express our thanks to Dr. Louis Berger for his helpful criticism of this paper and to Sister St-Maurice for invaluable technical assistance.

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A STUDY OF ASCORBIC ACID NUTRITION

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THERE has been considerable discussion regarding human requirements for ascorbic acid and also about the incidence of mild deficiencies of this vitamin. In the course of an examination of hospital diets an opportunity was available to study the effects of supplementing a customary "low" intake of ascorbic acid.

All of the subjects in this study were adult patients in a mental hospital, who had been in the institution for at least several years. It had been noted that the institutional diet provided rather small amounts of ascorbic acid, and the study was designed to demonstrate whether any beneficial effect could be observed in the physical condition of the patients when their ascorbic acid intake was increased. Many of the subjects were suffering from degenerative heart disease or from hypertension; otherwise, none were known to have any disease, other than mental illness. No member of the group was suffering from an acute infection or hyperthyroidism, so far as could be detected by physical examination.

The institutional diet supplied ascorbic acid only in the form of (*a*) canned tomatoes, which were served about once a week alone, and two or three times a week in mixed dishes such as rice and tomatoes; (*b*) other vegetables; and (*c*) cooked fruit. Cabbage salad appeared on the menu about once a week. No raw fruit was served. Since the vegetables were cooked in a central kitchen and transported to the wards for consumption, it is extremely doubtful whether any considerable amounts of ascorbic acid were retained. Although individual records of food intake could not be obtained from each patient separately, it was estimated that the average supply of ascorbic acid could not exceed 20 to 25 mgm. daily. The intake was about one-third of the allowance recommended by the U.S. Food and Nutrition Board but not much below the League of Nations' standard.

Approximately equal numbers of males and females were studied, with an age distribution of 20 to 70 in both sexes. All the subjects were given the same institutional diet. Each of the two main groups, male and female, was divided into three parts; one group, the control, was given no supplementation of the diet; in the second group, each subject was given 100 mgm. of synthetic ascorbic acid daily in two tablets; in the third, each subject was given 8 ounces of canned grapefruit juice daily, which was found by assay to provide 58 mgm. of ascorbic acid in 8 ounces. Sufficient supervision was given to ensure that these supplements were actually taken by the patients. Supplementation was continued for a three-month period in the spring of 1944. The subjects were examined at the beginning and end of the period of observation.

The examination consisted of an appraisal of the individuals' apparent nutritional status, with detailed examination of gums, skin and joints. The gums were examined macroscopically, by daylight, and with the biomicroscope for evi-

dences of redness, swelling, retraction and infection; with the biomicroscope pitting of the surface and capillary engorgement were observed. The skin of the face and extremities was examined for hyperkeratosis and petechial hæmorrhages. Joints were examined for tenderness, swelling, and limitation of movement. General physical examination was part of the regular hospital routine, and was not repeated by the nutrition team. The subjects were weighed at the beginning and at the end of the three-month period.

Blood estimations of hæmoglobin and of ascorbic acid were done before supplementation was started, after 6 weeks, and at the end of three months' supplementation. Five cubic centimetres of venous blood were taken on each occasion and oxalated; hæmoglobin was estimated as oxyhæmoglobin,[1] using a Coleman photoelectric colorimeter. The plasma ascorbic acid was estimated by the indophenol method of Mindlin and Butler.[2] Since the ascorbic acid supplements were given in the early afternoon and the blood specimens taken in the morning, it was felt that the ascorbic acid levels obtained were fasting levels.

OBSERVATIONS

(*a*) *At the beginning of the experiment.*—As is common among mentally ill patients, a number of the subjects appeared distinctly emaciated. Eleven males and twenty-eight females were edentulous; all these had a pallid, healthy-looking gingiva with no evidence of inflammation. In the remainder of the subjects, gingivitis was marked in a large number of cases, with severe oral sepsis in many patients. Owing to the type of patient, oral hygiene was definitely poor in most cases. The figures regarding gingivitis in Tables I, II and III do not include edentulous subjects.

A small number of patients showed hyperkeratosis, usually mild. In a very few patients, three or four petechial spots were present on the lower extremities; in no case were many petechiæ seen. Many of the older patients showed osteo-arthritic joint changes, with some accompanying limitation of movement; two men had joint signs with a clear history of previous severe injury in each case; no cases of swelling, soreness of limited movement of joints were seen which could be attributed to hæmorrhagic effusions.

TABLE I.

OCCURRENCE AND DEGREE OF GINGIVITIS BEFORE AND AFTER SUPPLEMENTATION

	None	*Slight*	*Moderate*	*Marked*
Controls:				
April	13	3	17	5
July	9	8	14	7
Fruit juice supplemented:				
April	11	1	7	5
July	14	5	3	2
Synthetic ascorbic acid supplemented:				
April	5	10	13	2
July	13	7	6	4
All groups:				
April	29	14	37	12
July	36	20	23	13

TABLE II.

CHANGES IN CONDITION OF THE GUMS IN REGARD TO *Acute* GINGIVITIS

	Unchanged	*Improved*	*Worse*	*Total*
Controls	15	9	11	35
Fruit juice supplemented	12	11	2	25
Synthetic ascorbic acid supplemented	14	12	4	30
	41	32	17	90

TABLE III.

CHANGES IN CONDITION OF THE GUMS IN REGARD TO *Chronic* GINGIVITIS

	Unchanged	*Improved*	*Worse*	*Total*
Controls	23	7	6	36
Fruit juice supplemented	13	4	8	25
Synthetic ascorbic acid supplemented	13	9	7	29
	49	20	21	90

The nutritional status of the subjects, as judged by physical examination, was as follows: good, 59 persons; fair, 5[illegible]; and poor, 14.

The plasma ascorbic acid levels at the beginning of the survey were markedly low: The average for all subjects was 0.07 mgm./100 c.c.; 65 subjects had no detectable plasma ascorbic acid, and only 28 had a plasma level above 0.1 mgm./100 c.c. Hæmoglobin levels were generally fairly satisfactory; the men averaging 14.2 gm., the women 13.2. Average for both sexes was 13.7 gm./100 c.c. (88%) with a range from 8.7 to 16.7.

(*b*) ***After supplementation.***—At re-examination, no significant change was found in nutritional status, weight, occurrence of hyperkeratosis and petechial hæmorrhages, joint signs or gingivitis. Tables I, II and III show the detailed results in the three groups in regard to gingivitis. Hæmoglobin levels likewise failed to show significant changes. The attendants did not note any change in appetite. The only significant change detected was a rise in the plasma levels of ascorbic acid in the supplemented patients.

Changes in the ascorbic acid values are shown in Table IV. The control group did not show any significant change in plasma ascorbic acid except for five women, who were thought to have received extra fruit provided by friends. Of the supplemented groups, those receiving 100 mgm. of ascorbic acid showed significantly greater rise in plasma level than those receiving 58 mgm. daily in grapefruit juice. With a supplement of 100 mgm. daily, 96% of the women and 81% of the men showed significant and sustained increases in the plasma ascorbic acid; with 58 mgm., 68% of the women and 53% of the men showed definite improvement in plasma levels. Both supplemented groups reached their final plasma levels within 6 weeks after supplementation was begun; no significant increase occurred in the latter half of the experimental period. The apparent large rise in the average plasma level of the women controls is caused almost entirely by the high levels attained by the five subjects who were thought to be getting extra fruit given to them.

TABLE IV.

OBSERVATIONS ON PLASMA ASCORBIC ACID

	Plasma ascorbic acid (Mgm. per 100 c.c.)				
Women	*Initial range*	*Initial average*	*Final range*	*Final average*	*Average increase*
Control	0–0.32	0.05	0.04–0.84	0.27	0.22
Fruit juice supplemented	0–0.16	0.09	0–0.82	0.48	0.39
Synthetic ascorbic acid supplemented	0–0.2	0	0–1.32	0.80	0.80
Men					
Control	0–0.68	0.08	0–0.62	0.14	0.06
Fruit juice supplemented	0–0.38	0.06	0–1.02	0.45	0.39
Synthetic ascorbic acid supplemented	0–0.54	0.17	0.12–1.02	0.72	0.55

DISCUSSION

In recent years students of deficiency diseases have given increasing emphasis to the occurrence of so-called subclinical deficiencies, caused by prolonged ingestion of less than optimal intakes of the various nutrient factors. Such intakes, it is alleged, are sufficient to prevent frank deficiency diseases, such as scurvy, but do not protect against other less disabling pathological conditions characteristic of subclinical deficiencies. In the case of ascorbic acid, gingivitis has been considered the most common manifestation of subclinical deficiency. A hypochromic, microcytic anæmia has also been ascribed to ascorbic acid deficiency.

The recommended allowance for ascorbic acid (70 mgm. for women, 75 for men) is regarded frequently as an optimal intake, giving an ample margin of safety above minimal requirements. The minimal amount necessary to prevent scurvy is not known with any certainty and there has been little agreement about the safe minimum necessary for "optimal health". Studies on human volunteers[3, 4] have indicated that intakes as low as 23 mgm. daily are capable of preventing scurvy. These studies have failed to confirm the existence of any subclinical deficiency signs. Even when experimental scurvy was produced[3] no gingivitis developed in the subjects. These investigations have shown that low plasma levels can exist for months without any clinical signs developing, and with no apparent impairment of optimal health; when, however, the ascorbic acid content of the tissues (*e.g.*, the white blood cells and platelets) begins to fall, clinical signs develop which are indistinguishable from classical scurvy.

The present study would appear to confirm those mentioned above. Careful examination failed to reveal any improvement in the physical condition of those subjects who were given supplemental ascorbic acid over a period of

three months. The only significant change was a rise in the plasma levels of ascorbic acid, but there was no indication that this had any beneficial effect. The results of the study indicate that an ascorbic acid intake of about 25 mgm. a day is adequate for an adult in ordinary life, though perhaps insufficient to meet emergencies such as febrile disease.

Several criticisms might be made of this study: (*a*) that supplementation was not continued over a sufficiently long period; (*b*) that the methods of examination were insufficiently exact to detect small differences; (*c*) that the numbers involved were too small, or (*d*) that the subjects were not sufficiently controlled to insure that the supplements were actually taken.

In regard to the first objection, it is firmly established that frank deficiency diseases such as beriberi, pellagra or scurvy clear up with astounding rapidity when the specific nutrient is supplied. The authors do not believe that a lesser degree of the same deficiency would require extended periods to show improvement when specific therapy is given; we therefore believe the three-month period ample.

Methods of physical examination are frequently capable of detecting only gross deviations from the normal. The methods used, however, were the same as those with which other investigators[5] have reported observable changes from ascorbic acid therapy.

The last two objections can best be dealt with together. That the supplements were actually taken was proved by the marked rise in plasma ascorbic acid in the majority of the supplemented groups. The amount of supervision necessary to ensure this would not have been practicable for a larger group of subjects. In planning the study it seemed advisable to use a small well-supervised group rather than a large group poorly supervised. The results obtained from the survey were subjected to statistical analysis in order to eliminate any differences due to chance. Statistical treatment of the data indicated that there were no significant differences in physical conditions among the three groups except with regard to plasma ascorbic acid.

SUMMARY

A study of 129 subjects was made over a three-month period; all the subjects had had a daily ascorbic acid intake of about 25 mgm. for some years. During the three-month period part of the group received about 25 mgm. ascorbic acid daily, part 85 mgm. and part 125 mgm. Plasma ascorbic acid and hæmoglobin determinations, and examination of the subjects were done at the beginning and at the end of the period, and plasma ascorbic acid levels were also determined six weeks after the beginning of the study. A significant rise in plasma ascorbic acid occurred in the supplemented groups, the maximum being attained within six weeks after supplementation began. The maximum was significantly higher in the subjects receiving 125 mgm. daily than in the 85 mgm. group.

Hæmoglobin levels were significantly higher in men than in women. No rise in hæmoglobin levels occurred in the supplemented groups. Gingivitis was prevalent in all subjects; no significant improvement occurred in the supplemented groups in the three-month period. In no way did the physical findings on re-examination suggest any improvement in those subjects who received supplements of ascorbic acid above their usual intake of about 25 mgm. a day.

This investigation was greatly facilitated by a grant from the International Health Division of the Rockefeller Foundation for which appreciation is expressed. The excellent co-operation of the staff of the hospital made possible this study.

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Infantile paralysis cases increased only slightly during the week ending August 18, giving rise to the hope that the peak of cases for this season may be near or even passed. The total number reported to the U.S. Public Health Service was 692. This represents an increase of only 21 over the previous week's total, when cases jumped by 197 to reach a total of 671. The total number of cases since January 1 is 4,276, compared to 6,262 for the same period last year.—*Science News Letter*, September 1, 1945.

VALEDICTORY ADDRESS

By Harris McPhedran, M.B., F.R.C.P.[C.]

Toronto

IL est convenable à cette assemblée de l'Association Médicale Canadienne, tenue à Montréal, de dire quelque mots de bienvenue, à l'endroit de nos confrères de la Province de Québec, et dans leur propre langue.

N'est-ce pas spécialement approprié, à l'occasion de l'installation ce soir, de l'un de vos collègues, à la présidence de l'Association Médicale du Canada?

C'est l'espoir de tous, je suis certain, que ce geste portera des fruits riches et que nous nous donnerons la main, afin que l'Association Médicale Canadienne soit une force en tout ce qu'elle entreprend pour le bien de la population du Canada.

Ne serait-il pas louable aussi, si cette réunion marquait le chemin pour une meilleure compréhension individuelle parmi tous les gens du Canada. Plus que cela, ce serait rassurant et d'un puissant stimulant, si chaque citoyen contribuait de son mieux, à promouvoir par ses lumières et ses capacités, à élever dans ce pays, une grande nation Canadienne.

Ceci peut-il signifier, que nous, les docteurs dans le Canada, visitant toutes les familles, prendrons la direction de cette entente si grande et si nécessaire? Croyez-moi, d'années en années, il y a plus d'Anglais qui désirent apprendre et de comprendre le français. Ainsi nous vous connaîtrons davantage et comprendrons plus votre manière de vivre.

Vous excuserez la brièveté de mon discours dans votre propre langue. Bien que faible, peut-être, cette tentative est une évidence de l'admiration, toujours grande, que j'ai, pour votre langue française.

Je vous souhaite le bienvenue.

* * * *

At the beginning of this valedictory address I should like to take this, my earliest opportunity, to thank all those whether of the Executive and Council of the national organization or its Divisions, for their unfailing cooperation in all things connected with the advancement of the science and practice of medicine in this Dominion.

Since our meeting in Toronto in May, 1944, I have had the opportunity and privilege of attending the annual meetings of each of the Divisions. This trip across Canada by air or by rail and the conferences at the various Divisional meetings have given me a rare, rich and enviable experience.

In Quebec and the Maritimes the problems considered were mostly those of local concern, as in none of these provinces was there any legislation under consideration dealing with "health insurance".

ONTARIO

In Ontario: (1) the Vivian Bill to provide medical services in a municipality or group of municipalities was passed all too rapidly through the legislature. It became law but so far the plan set forth in the Act has not become operative. (2) The Hollinger plan has been adopted by several mining companies in northern Ontario. Discussion has taken place with a view to amalgamating Associated Medical Services and the Windsor Medical Services. (3) The Council of the Ontario Medical Association, at a recent session, authorized the institution of a prepaid plan for surgical care in and outside hospital. (4) Funds provided by the government of Ontario for medical and surgical care of the welfare group are still disbursed by the Board of Directors.

MANITOBA

The Manitoba Division has inaugurated a plan operative since September, 1944, giving (*a*) complete coverage, or (*b*) partial coverage for maternity care and surgical procedures in hospital. The membership in these prepaid plans is growing. The plan for complete coverage has been chosen, I am informed, by 75% of applicants and partial coverage by 25%. Subsequently an Act (The Health Services Act) to provide for the "Improvement of the Health of the Citizens of the Province" was passed by the government at its last session. The plan of administration is not in accord with our tenth principle.

SASKATCHEWAN

At the time of the meeting of the Saskatchewan Division, Dr. Sigerist was busy making his survey. This report has since been issued. Since it advocates a scheme which is fundamentally "State Medicine", it cannot receive the support of organized medicine. The

Douglas Government has taken steps to provide health services for old age pensioners, the mothers' allowance group and their dependents, the blind and wards of the province—some 25,000 in number. These will be entitled to medical and surgical care in home and hospital at the rate of $9.50 per person per year. Fifty per cent of the doctors' bills, rendered on a fee-for-service basis, are to be paid as soon as rendered, after being taxed. The balance of the bills are to be paid (after taxing) at the end of the year on a *pro rata* basis from the funds available. This is an experiment that will be followed with great interest as it provides complete medical care for *a group* and should give (*a*) some idea as to whether it is satisfactory to doctor and patient, (*b*) experience in administration, (*c*) an estimate of costs involved in operating the scheme, and (*d*) the amount of money that eventually reaches the doctors' pockets.

ALBERTA

Alberta has passed a Maternity Act which provides free hospital care for all maternity cases. No payment is made if mothers are confined at home. Difficulties have been encountered in those areas having no hospitals, as many maternity cases are said to be leaving the family doctor and going to hospitals where he cannot attend them. It is reported that doctors in such areas claim they cannot make a living if their maternity cases by-pass them and go to hospitals outside the areas they serve. The ultimate solution to this unfortunate situation lies in providing hospital accommodation in the areas where there is none at present, so that doctors will stay in those areas at present without hospitals and render what services they can to the residents of these districts.

BRITISH COLUMBIA

In British Columbia the voluntary "Medical Services Association" approved by the Council of the College of Physicians and Surgeons is reported to be working to the satisfaction of most of those concerned. There are, however, so many other voluntary schemes in operation in this Province which seem to be less satisfactory, that the government has appointed a Royal Commission to investigate all voluntary schemes. The findings of this Commission should prove helpful if they include the basic requirements for the operation of any voluntary scheme whether controlled by laymen, laymen and doctors, or doctors, and they should be a useful guide to any group considering the institution of voluntary schemes elsewhere in this Dominion.

The British Columbia Division has set a good example in preparation for the inauguration of a government-sponsored health plan. Members of all those organizations which will be concerned in the rendering of health services under such a plan have been meeting monthly since last fall to discuss their mutual problems, and it is reported will meet next year with representatives of the larger groups who will be receiving services under a national or provincial scheme. This is a step in the right direction. This procedure should be adopted, I believe, in each Province of this Dominion, to the end that both the members of the medical and allied professions and the public may be educated in all that pertains to the attainment of better health.

At all the divisional meetings there were excellent scientific programs, demonstrating that the members of the profession, while earnestly considering matters that deeply affect their future, have not lost sight of their main purpose in life, namely, the alleviation of suffering, the prevention and cure of disease wherever and whenever that is possible.

MEETINGS WITH LAY ORGANIZATIONS

Last year, at the annual meeting held in Toronto, authority was given your Executive to meet representatives of those larger organizations whose membership represents a high percentage of the population of this Dominion, in order to discuss health and health services. To date representatives of this Association have met with representatives of Labour (the Trades and Labour Congress of Canada and the Canadian Congress of Labour), the Manufacturers (the Canadian Manufacturers' Association and the Canadian Chamber of Commerce), the Veterans (the Canadian Legion and the National Council of Veteran Associations), the Life Officers' Association, and more recently CAMSI. All of us were impressed with the sincere desire of these various bodies to work with the Canadian Medical Association towards providing improved health services. The repre-

sentatives of these organizations told us, among other things:

(1) That they were looking to the Canadian Medical Association for leadership. (2) That they were willing to assist in every way possible in providing improved health services. (3) That they were convinced such meetings were of great value and hoped they would be continued. (4) That at some not too distant date, representatives of all these groups should meet together with representatives of the Canadian Medical Association to discuss all matters relating to health, in the hope of initiating a plan whereby the good things arising from advances in the science of medicine would become available to every citizen of this Dominion. (5) That the administration of any scheme should be kept out of politics as far as possible so that matters of health and health services should not become a political football.

Three requirements for improved health services were stressed: (1) The need of education of the public. (2) Extension of preventive health measures. (3) Increased hospital accommodation.

The representatives of CAMSI were very frank in stating their views: (1) They were opposed to becoming state servants, preferring to retain their independence in practice. (2) They thought the Canadian Medical Association had been remiss in not regularly presenting its views to the members of CAMSI and thus creating an intelligent interest among its members, in the work of the Canadian Medical Association. (3) They suggested a wider distribution of the *Journal* to the intern and student body at a reasonable rate. (4) They agreed that a junior membership in the Canadian Medical Association would be beneficial.

If these steps were taken, they felt sure a great deal of indifference and some hostility to the Canadian Medical Association, (about whose work they confessed little was known by them) would disappear and that we would have an increased and also informed membership from their young associates as they took up practice.

Having had such a large measure of success from meeting representatives of these various organizations, it is hoped the same procedure will be taken up by the various Divisions and that it will extend right down to the smallest Society in each Division. In this direction lies our hope of educating the public, enlisting their intelligent interest and directing their thinking and activities in all that pertains to improved health services.

Inasmuch, therefore, as the time has now come to deal with matters other than principles and ideals, it is now our responsibility to lay the foundation of some procedure, so that in the not too distant future we may meet representatives of the above and other organizations to discuss it freely with them, in the hope that out of such discussions a firm foundation on which we may build and keep building, better health services will be evolved. A tentative report as to what the foundation requirements for improved health services should be, has been placed before Council and will, I hope, be passed to the Divisions for their consideration and action.

These requirements are briefly: (1) Institution of full preventive measures in each province. (2) A long range plan for increased hospital accommodation, etc. (3) Increase in diagnostic services as provided by the establishment of laboratories and radiological departments in or at strategic centres. (4) Complete services, medical, surgical, hospital, nursing, pharmaceutical, for the welfare group in each province, (*i.e.*, for those on relief, the blind, old age pensioners, mothers' allowance cases and their dependents). (5) Education (*a*) of the public, (*b*) of the profession. (6) Implementation of our second principle by all governments, as this is fundamental to the fulfilment of any scheme for improved health services.

Much work has been done in making provision for (1) postgraduate instruction of Medical Officers now in the armed forces, (2) their establishment or re-establishment in civil life.

Refresher courses of 6 to 8 weeks at a cost of $50.00 per person taking them, have been or are being set up in all hospitals connected with our teaching institutions and in the larger non-teaching hospitals. Moreover, provision for an increased number of senior interns and residents is being made for those desiring longer periods of post-graduate training in order to qualify as specialists. This work has been carried out, largely, by a committee set up by the C.M.P.A.B. Composed of representatives of the medical faculties, the teaching hospitals,

the larger non-teaching hospitals and the Royal College, it has done excellent work in devising a plan for postgraduate instruction under the able chairmanship of Dr. John Fraser of Montreal. How the plan will work is as yet uncertain. There will no doubt be "bugs" in the machinery, but these can and will be eliminated by the co-operation and good will of all concerned. One gains the impression that many M.O.'s will seek shorter courses only, as owing to increased responsibilities and limited financial resources many will desire to get settled in practice as soon as possible.

Establishment and re-establishment is a problem not only for the national association but for every Division and every Society within the Division. To that end one Divisional Advisory Committee of the C.M.P.A.B. has recommended to its Division that re-establishment committees be set up in each Society: (1) to gather information for the D.A.C. by way of a survey as to the medical requirements and opportunities in each county or district, (2) to give a helping hand to any doctor who wishes to establish or re-establish himself within the confines of a county or district.

Thus the responsibility will be shared among the Canadian Medical Association, its Divisions and Societies, and is finally centred in the county or district where a doctor is contemplating the establishment or re-establishment of himself in practice. It is hoped, moreover, that these same committees will be a nucleus not only for the education of the doctors in an area, as to the ways and means to be adopted for improving health services, but also for the enlightenment of the public as to its opportunity, responsibility and liability, in the development of a method of procedure. By this method, principally, can we of the public and the professions hope to influence our representatives in parliament or legislature concerning the proper approach to and solution of this problem of health services.

To our men in the armed forces we pay our tribute of praise and gratitude. They have done magnificent work whether in the field, in hospital or laboratory, establishing forever "Canadian medicine". We thank them for their ability, resourcefulness and courage. Regrettable casualties and deaths there have been. To those who have made the supreme sacrifice and to their kin we humbly bow our heads in thankfulness.

To those who have carried on civilian practice, many handicapped with disability and the burden of age, this country owes a profound debt of gratitude. Through their untiring efforts, the health of the people of this country has been maintained at a high level. Without them our magnificent war effort would not have been achieved. They have set an example to the oncoming generation of doctors and may well say to them:

> "To you with failing hands, we throw the torch;
> Be yours to hold it high."

The science of medicine is international, its aims are, or should be, the same the world over. We must take our place along with similar organizations in other countries in spreading the gospel of health, in preventing wars and in helping to make available to all people adequate health services. Labour has set up an international organization to accomplish its ends; agriculture is considering a similar step. There is an International Chamber of Commerce, dormant since 1939 but meeting again this fall in London. Is the time not opportune for medical men the world over to take similar steps and form an international organization with the primary object of ensuring better health and medical services to all people, but at the same time co-operating with all people and organizations who seek to preserve, as far as is possible, peace on earth and good will toward men? It seems to me that now is the time, when millions of the people of this world are suffering mentally and physically as the result of war, to initiate such an organization for the welfare and future happiness of mankind. Has the Canadian Medical Association the initiative and the courage to set the wheels in motion to start on a journey to this far-off goal?

We have lived through nearly six years of heart-breaking, horrible times and difficulties. In Europe military victory has been achieved. Peace will bring (and even now is bringing) more difficult problems urgently calling for a solution. These must, can and will be solved, I believe, by good will, patience, and above all courage. These are the most precious weapons that we possess and need, to face and solve our difficulties. Everyone must be prepared to

tackle his or her individual problems fired by the example of those who pioneered in the settling of this Dominion, emulating their independence, co-operation, tolerance, capacity to work and above all their courage.

With faith, with malice to none and charity to all, courageous and unafraid, let *us* go forward to serve the people in this country, to the end that they may live out their lives in healthy, happy surroundings.

"And I said to the man at the gate of the year,
'Give me a lamp that I may tread safely into the unknown.'
And he replied, 'Go out into the darkness
And put your hand into the hand of God.
That will be better than a light
And safer than the known way.'"

TUBERCULOSIS PREVENTION

By D. M. Gibson, M.B.(Lond.), F.R.C.S.(Edin.)

Weston, Ont.

IT is the primary duty of the State to prevent disease and promote health. It is the inestimable privilege of the medical profession to make fulfilment of this obligation both possible and effective.

The three chief requisites for the successful prevention of tuberculosis are early detection, adequate detection and adequate segregation. By "early detection" is implied the discovery of incipient tuberculous lesions in the lungs before the onset of cough, and if possible, before the gross contamination of sputum and saliva with tubercle bacilli. By "adequate detection" is meant the discovery of all those suffering from active tuberculosis in any given community. By "adequate segregation" is intimated the provision of sanatoria or supervised settlements where patients with open infective tuberculosis can live pleasantly and profitably without being a menace to the non-tuberculous community. Much has been done along these lines, but a great deal still remains to be done. Even now, far too few cases of pulmonary tuberculosis are diagnosed in the early pre-infective stage. Right at this moment far too many cases of open infective tuberculosis are at large in the community. These persons are spreading the disease all unwittingly and often infecting the very people whom they would most desire to protect from injury and disease.

A survey of 1,000 recent admissions to the Toronto Hospital, Weston, has been made in relation to the preventive aspect of the situation. These were cases of parenchymal pulmonary tuberculosis admitted from the community. Cases transferred from other sanatoria have not been included. Of these 1,000 cases, 774 were first admissions and 226 were re-admissions.

Certain facts of possible interest and significance have been brought to light as follows:

TABLE I.
AGE AND SEX DISTRIBUTION

Age group	*Male*	*Female*	*Total*
1 to 15	51	57	108
16 to 30	142	230	372
31 to 50	198	123	321
Over 50	155	44	199
Total	546	454	1,000

In relation to the above table, it is interesting to note that while in the 1 to 15 age group the sex distribution was more or less equal, the 16 to 30 age group showed quite a preponderance of women, *viz.*, 230, to 142 men. In the older age groups, however, men preponderated and noticeably in the over-50 group. In this latter group there were 155 men and only 44 women. There were patients of 70, even 80, in this group and first admissions at that—the infective grandparent.

Why this preponderance of women in the 16 to 30 age-group and of men in the older age groups? Do women wear better than men, or do they take better care of their health in middle or old age? Or do women have a greater resistance to tuberculosis than men in later life? This discrepancy of sex distribution in the different age groups as just mentioned, invites an explanation. It can hardly be a merely fortuitous finding. However, possibly more thorough x-ray investigation of the older age groups would reveal less disparity in the sex incidence.

The total admissions under 31 were 480, those over 30 numbered 520. This would suggest that our zeal for x-ray surveys should by no means be confined to the younger age groups. The number and age distribution of re-admissions also seems to bear this out. Of

the 226 re-admissions only 2 were in the 1 to 15 age group, 76 in the 16 to 30 age group, 87 in the 31 to 50 group and 61 in the over 50 group.

Positive sputum.—Table II reveals a high percentage of positive cases in the whole series and a preponderance of positives over negatives in all the age groups except the 1 to 15 group.

Analysis of this table shows that whereas in the 1 to 15 group only 13.5% were positive in the 16 to 30 group the proportion was 72.8%, in the 31 to 50 group 73.2%, and in the over-50 group 85.2%. Further, in a very large proportion of those with positive findings, the sputum was positive on direct smear. There was thus a great preponderance of highly infective cases in the three older age groups (see Table III).

These findings suggest that there are still far too few cases being detected in the early pre-infective or mildly infective stages. They also indicate that there are probably far too many people in the older age groups with strongly positive sputum, who are still at large and spreading the disease.

It is significant also that of the cases in which tests were positive for the presence of tubercle bacilli almost 40% would have been missed by examination of direct smears alone. Further, some of the cases listed as negative on their admission series of tests were found to be positive some months later when further tests were done. All this goes to show the unreliability of sputum tests, especially if few and by direct smear alone, as a criterion for or against admission to sanatorium. Undoubtedly an x-ray film showing changes suggestive of tuberculosis is in itself a very strong indication for admittance to a sanatorium where exhaustive tests can be made and where the patient can be on a regimen conducive to healing from the earliest possible date.

In a few cases in this series the tubercle bacillus was not found until a bronchoscopic examination was made. With regard to this procedure it is becoming a fairly frequent experience to find evidence of tuberculous bronchitis even, in some cases, in a lung which appears by the x-ray to be free from parenchymal change. Tuberculous bronchitis is a serious complication often leading to stenosis. The earlier it is discovered, therefore, the better.

In a great many of the cases in this series the tuberculous diagnosis was uncovered while the patient was in a general hospital, having been admitted on account of some other suspected condition. It would be well if more cases of pulmonary tuberculosis were diagnosed at chest clinics, as the admission of active infective cases to the wards of a general hospital carries an undesirable risk, both to nurses and also to other patients. Many such cases are acutely ill with far advanced pulmonary tuberculosis. How much better if they had been diagnosed by x-ray in the earlier stages of the disease when their infectivity might have been abolished and their prospects brightened by collapse therapy or by adequate bed rest in a sanatorium.

Cough.—Active coughing must help to distribute infective material in the air breathed by other persons. Of the 714 positive cases in this series, 631 gave a history of cough. In 230 cases the cough was recorded as of less than six months' duration. In 106 cases, the cough could be described as chronic, extending from periods of over one year to twenty years. In 129 cases, duration was of from half to one year

TABLE II.

POSITIVE FINDINGS

Age group	*Direct smear*	*Concentration*	*Culture*	*G.C. Conc.*	*G.C. Cult.*	*G C. G.P.I.*	*Broncho-scopy*	*Total Pos.*	*Total Neg.*
1 to 15 ..	12	7	3	4	6	5	1	38	70
16 to 30 ..	149	65	9	11	22	7	8	271	101
31 to 50 ..	154	46	14	9	4	3	5	235	86
Over 50 ...	119	33	13	2	–	–	2	170	29
Total ...	434	151	39	26	32	15	16	714	286

TABLE III.

PROPORTION OF POSITIVE CASES

Showing Tubercle Bacilli on Direct Smear

Age group	*No. positive*	*No. Pos. on D.S.*	*Percentage*
1 to 15	38	12	31.5
16 to 30	271	149	54.9
31 to 50	235	154	65.5
Over 50	170	119	70.0
Total	714	434	60.7

and in 111 cases the cough might be classed as occasional.

Too often a cough is passed off as due to cigarette smoking, or to bronchitis and either neglected or treated with "cough mixture", when a timely x-ray would have revealed tuberculosis.

Contact.—In only 219 cases was there known previous contact with a tuberculous person and in many cases the contact was long years ago. In 102 cases the tuberculous contact was a parent or parents; in 62 cases a brother or sister; in 11 cases an uncle or aunt and in 44 cases others such as contact at work. There is no special significance in these findings except to emphasize the importance of prompt and "adequate segregation" of known cases and thus the importance of knowing what cases need to be segregated.

On the admitting sheets of the patients in this series there were recorded the names of those in close contact with each case. In connection with the "positive" cases these lists included 670 children of ages 1 to 16. The prolonged contact of infective cases with children is deplorable. It can be prevented by early detection and prompt segregation of infective cases in all age groups.

Occupational contact.—A tuberculous person's opportunity for infecting others is often greatly enlarged by the type of his occupational contacts and activities.

In addition to home contact, the following significant occupations were among those listed in connection with the positive cases: factory in 120 cases; office in 118; school in 36; food handlers, waiters, cooks, etc., 25 cases; laundry 20 cases. The list also included three barbers, two butchers, a baker, a beef caser, a bee keeper, a bus driver, a nursemaid, two elevator men, an ambulance driver, a cheesemaker, a candy maker, a fruiterer, a hairdresser, a milkman, a Pullman porter and a social worker.

All this suggests that increased x-ray surveys of special trade groups might bring to light a not inconsiderable number of infective individuals who at present are a serious menace to the community.

SUMMARY

One thousand recent admissions to the Toronto Hospital, Weston, on account of parenchymal pulmonary tuberculosis have been surveyed from the public health angle.

No less than 520 were over 30 years of age. In the under 31 age groups, women preponderated. In the higher age groups, men preponderated and noticeably so in the group over 50.

Of the total number, 714 gave findings of mycobacterium tuberculosis in their sputum or gastric contents. In 434 of these, the sputum was positive on direct smear and in another 151, sputum was positive on concentration.

Concomitant cough was a common finding.

Occupational facilities for infecting others were plentiful.

Pulmonary tuberculosis is a disease of all ages.

From the point of view of prevention there would appear to be an urgent need to discover active infective cases in the older age groups at an earlier stage than is frequently the case at the present time.

More alacrity in advising chest x-rays in cases with suspicious symptoms and a considerable extension of the mass survey method would seem to be not only desirable but imperative.

Toronto Hospital for
Treatment of Tuberculosis.

RÉSUMÉ

1000 cas récents de tuberculose pulmonaire sont analysés au point de vue de l'hygiène publique. 520 ont plus de 30 ans; chez les plus jeunes, les femmes prédominent tandis que les hommes sont plus souvent touchés après 30 ans, et encore davantage après 50. 714 ont eu un Koch positif dans les crachats ou le contenu gastrique. La toux est fréquente chez ces malades. Le genre d'occupation des sujets observés indique un essaimage considérable de l'infection. En somme, la tuberculose pulmonaire frappe tous les âges. Il s'agit de dépister le plus précocement possible les malades adultes ayant dépassé la trentaine, de faire des radios diagnostiques dans tous les cas douteux et d'en arriver à une prophylaxie massive vraiment opérante.

JEAN SAUCIER

The practical application of current knowledge to the alleviation of suffering and the prolongation of life is the privilege of the physician or surgeon. Disease is organized. Part of its organization is known; a greater part unknown. Research deals with the latter; it attempts to discover: in humbler branches to confirm and extend the discoveries of others; in the higher branches to obtain knowledge at first hand on matters about which little or nothing is known.—Mervyn Gordon, *The Lancet*, 1: 807, 1945.

DISUSE ATROPHY OF SKELETAL MUSCLE

By Capt. W. B. Ayre, R.C.A.M.C.

A SOLDIER whom I recently examined exhibited definite atrophy of the thigh and calf muscles of the left lower extremity. This was apparently the result of disuse during a six-week period of fracture convalescence ten years ago. The occurrence of disuse atrophy which was apparently permanent aroused my interest in the fundamental nature of skeletal muscle atrophy.

CASE HISTORY

The patient was an adult male 25 years of age, who, ten years earlier, had sustained a fracture involving the distal one-third of the left tibia. At that time the leg had been immobilized in a fracture cast, extending from the toes to just above the knee, for a period of six weeks. He now complained of weakness in the left leg and some discomfort in the left ankle. The subjective enquiry was otherwise negative.

On examination he appeared to be a well built adult male in apparent good health. The only positive findings were related to the extremities. The muscles of the left lower extremity were obviously atrophied on inspection. As measured, the left lower extremity was smaller in diameter throughout. Twenty-two centimetres below the anterior superior spine the right lower extremity measured 51.5 cm., the left 49.5 cm. At the point of maximal circumference the right calf measured 34 cm., the left calf 31.5 cm. The left foot was slightly everted. The reflexes were normal. There were no sensory disturbances. There was no apparent weakness and muscle coordination was good. The dorsalis pedis and posterior tibial pulses were present and equal bilaterally.

The neurological consultant stated "All movements are present both voluntarily and electrically, there being good faradic response in all the muscles of the affected leg."

As disuse atrophy of skeletal muscle is coming more and more to our attention as a sequel of battle injuries a review of the relative facts presented in the literature may be of some interest.

Historical features.—Early observations on muscle atrophy associated with arthritis were made by Hippocrates. John Hunter (1776), and Brown-Sequard (1860) noted similar cases. Raymond[1] in 1890 did some of the first experimental work in this field. He demonstrated that atrophy in the arthritic limbs of animals could be prevented by severing the posterior roots of the related spinal nerves. This demonstrated, later workers contended, that the fundamental cause of atrophy in arthritic limbs is disuse. Cutting the posterior roots, they argued, removes the restrictions imposed by painful impulses and allows free movement of the extremity. Thus disuse atrophy is prevented. Sulzer[2] in 1897 observed that when a muscle (*e.g.*, rectus femoris) spans two joints and one is ankylosed, the other normal, this muscle exhibits less atrophy than one whose origin and insertion are directly related to the ankylosed joint. Prompted by this observation, he demonstrated, in experimental work which followed, that fixation alone of an otherwise normal limb will cause muscle atrophy.

Tower[3] has recently made a thorough study of the pathological changes in muscle subjected to complete disuse. In her series of detailed experiments it is first demonstrated that muscle depends entirely on its related anterior horn cells for trophic control; and that these impulses reach the muscle through no other connection but the motor nerve. After isolating the muscle from all other contact with the central nervous system the subsequent changes were studied.

Etiology.—Simple disuse, whether induced by fixation or by painful stimuli from arthritic or fractured limbs, will result in rapid muscular atrophy. The actual mechanism is obscure. In arthritis some consider the absorption of toxins locally of importance. Reflex effects from a traumatic site have been considered causative by others. Sutton[4] describes cases of this type. Following trauma he found that in some instances atrophy of the immediately related muscles progressed for approximately three months. The atrophy was permanent. Suggesting the possibility that degenerative processes were initiated in the spinal cord by continuous painful impulses from the traumatized site he designated these "post traumatic reflex amyotrophy". Spinal cord changes however have never been demonstrated.

It has long been recognized that muscle metabolites, acting directly on the wall of the immediately related vessels, have a powerful vasodilator effect. The importance of muscular action in massaging the venous return towards the heart is also well established. Fixation or disuse markedly interferes with these activities. With these considerations in mind the possibility of a vascular factor in the etiology suggests itself. Ready opposition to this possibility however is found in the observation of Lipmann and Selig[5] that thrombo-angiitis obliterans may be present for years without any occurrence of muscular atrophy. Also, Hirohashi's unexpected finding[6] that the actual blood flow per cubic centimetre of muscle tissue and the coefficient of

oxygen consumption are higher in an atrophic limb than in a normal limb raises an objection which cannot be summarily dismissed. It is to be expected that if equal volumes of blood enter the femoral arteries of both limbs the actual flow per cubic centimetre of tissue will be greater in the atrophied limb. However, the fact that the coefficient of oxygen consumption is also greater in the atrophied limb cannot so readily be explained. Hirohashi also notes that the degree of increase in the coefficient of oxygen consumption parallels the degree of muscular atrophy. This relationship is clear until approximately the end of the second month and thereafter becomes less well defined. There is no adequate explanation for these findings.

Although immobilized the muscle may be tensed. It has been suggested that repeated voluntary tensing will prevent disuse atrophy of the muscles concerned. Experience has shown efforts in this regard however to be only partially successful. Ability to actually shorten the muscle appears to be of real importance. Hill[7] demonstrates that the energy of a contraction is not set free in an all-or-none outburst but continues to appear as shortening progresses. The modern conception of muscle, as proposed by Hill and others, is of a structure composed of long chains of myosin, each chain having numerous side links. It is suggested that with shortening the side links interact, releasing a catalyst on which further energy release is dependent. Dugald Brown[8] states:

> ". . . . the energy liberation is so dependent on the process of shortening that it seems clear that the catalyst is actually built into the linkage and that its activity is subject both to the degree of infolding on the active linkage and the presence of a specific substrate."

In this regard one recalls that quadriceps atrophy is often extreme and very troublesome. Why this muscle should be particularly involved and to such an extreme degree has long been a puzzling problem. The importance of shortening in the full development of contraction may be one factor in the explanation. Conditions which necessitate immobilization involving the quadriceps as a rule demand that the knee be somewhat flexed. This stretches the quadriceps and the modicum of shortening which might otherwise be allowed is encroached upon. It is also interesting to note that Fischer[9] in his studies of the x-ray diffraction patterns of muscle recognizes that when a stretched muscle is isometrically contracted there is a distinct difference in the diffraction pattern as compared to the pattern it gives when contracted isometrically at resting length. He concludes that stretching the muscle results in a change in the inter-relationship of the submicroscopical elements (micellæ and intermicellar spaces) which modifies the intrinsic character of the contractile process. That these changes are related to the unusual degree of atrophy which results when conditions are right for their occurrence can however at present only be tentatively surmized.

Pathology.—In a typical case rapid atrophy is noted following fixation. Actual data on the rate at which this occurs has been compiled by Chor and Dolkhart[10] who studied the progression of disuse atrophy of skeletal muscle in monkeys. They found a 4.9% atrophy at the end of one week. Atrophy steadily progressed, except for a slight remission in the fourth week which cannot be explained, until the end of the second month. At this time 39 to 40% of the original weight of the muscle had been lost. Solandt[11] found an even more rapid atrophy in his experiments and also noted the remission of the fourth week.

The microscopic changes have been studied by Tower.[3] By isolating the muscle from all nervous connection except the anterior horn cell—the source of trophic control—complete disuse was insured. The resulting changes found were atrophy of the muscle cell and proliferation of the interstitial fibrous tissue. Atrophy is characterized chiefly by a loss of sarcoplasm. This is particularly noticeable in the region of the sole-plate. As atrophy progresses and becomes severe the subsarcolemmal nuclei become thinner. The fibrillæ show no apparent changes throughout except a tendency to paler staining.

It is Tower's opinion that when disuse atrophy of muscle is permanent it is due to interference with the nutrition of the muscle cell which results from the increased interstitial fibrous tissue. In a case of simple disuse this is the probable cause of permanent change. In many cases of fracture immobilization however interference with the blood and nerve supply by excessive œdema, or pressure effects from an improperly applied cast, or contracting scar tissue about the site of injury, will also produce permanent changes in the related muscles which in many cases cannot be readily differentiated from the changes due to simple disuse. Indeed, it has

been stated that all cases of increased fibrous tissue proliferation in immobilization are due to pressure effects from improperly applied casts. It is noted however that Tower's technique does not require the use of a cast yet the increase in fibrous tissue is a definite element in the resulting picture.

Hines and Knowlton[12] also explain the chemical changes found in atrophic muscle by reference to the change in the proportion of fibrous to muscle tissue. They noted that in all types of experimental atrophy there was a decrease in muscle cell water and an increase in non-muscle cell water. There was no absolute change in the acid soluble phosphorus and potassium content. The total chloride and calcium were increased. All of these features can be explained as the result of the change in the relative proportion of the two tissues.

Further, with regard to chemical changes all factors suggest that a negative nitrogen balance follows immobilization. There is the actual loss of tissue from the muscles which undergo atrophy. In addition a study of the weights tabled by Thompson[13] while observing disuse atrophy in rabbits reveals that there is uniformly a more marked loss of total body weight than would be expected from the loss from the immobilized limb alone. A negative nitrogen balance is therefore to be expected. This fact is of interest in association with the finding in recent studies of an unusual nitrogen balance in most cases of fracture convalescence. Studies by Howard *et al.*[14] conclude that the total negative nitrogen balance in these cases cannot be due to disuse alone. This does not tell us however how much may be due to disuse. Nor do we know whether or not, as in cases reported by Stevenson[15] the nitrogen excretion is accompanied by a rise in the urinary excretion of 17-ketosteroids. Investigation of these aspects as applied to disuse atrophy in skeletal muscle would be of interest.

DENERVATION ATROPHY

With denervation the changes in the electrical reactions are definitely characteristic, otherwise denervation atrophy is similar to disuse atrophy in many respects. The actual progression of the process—its rapidity—is much the same. During the first two months, as in disuse atrophy, the coefficient of oxygen consumption is increased. But denervation atrophy of long standing continues to actual degeneration. Tower[16] found that during the process there was first an increase in the number of subsarcolemmal nuclei and an infiltration of polymorphonuclear leucocytes (many basophils noted) and later the contractile elements gradually disappeared, to be replaced by fibrous tissue. Denervation atrophy is also characterized by the development, five days after denervation, of noticeable small fibrillary twitches in the involved muscles. It has been shown that these result from the development of a hypersensitivity to acetylcholine. No fibrillary or fasciculary twitches are seen in atrophy which results from disuse.

COMMENT

Atrophy in an organ or tissue follows so invariably upon disuse that we have come to accept it as the result of a biological law. To recognize its invariable occurrence, associate it with a biological law, and then to rest content, is not however satisfactory. We remain in entire ignorance of the mechanism which relates cause and effect, the knowledge of which alone places mastery in the physician's hands.

The usual concept of disuse atrophy is one which pictures a gradual decrease in cell size over a prolonged period of inactivity. Reduced vascularity or some alteration in trophic control is believed involved.

On inquiry into the process as related to skeletal muscle one is struck with the unusual rapidity with which atrophy occurs. And further, recent metabolic studies have revealed conditions oddly at variance with our concepts in this regard. These unusual features suggest that we may be in error in continuing to regard immobilization atrophy in the old light. Further studies may alter our conception of the essential nature of the process.

SUMMARY

1. A case of permanent disuse atrophy in skeletal muscle the result of a fracture sustained ten years ago is presented.

2. The development of the concept of disuse atrophy as related to skeletal muscle is outlined.

3. The possible etiological factors are discussed. The importance of inability to actually shorten an immobilized muscle with contraction is pointed out.

4. The pathological changes are described; and possible causes for the occurrence of permanent changes with atrophy are discussed.

5. It is noted that the findings in some recent investigations relating to disuse atrophy in skeletal muscle are in some regards at variance with our usually accepted concept of disuse atrophy; and it is suggested that this concept may eventually be changed. Further study is necessary to give us more insight into the fundamental nature of this process as it involves skeletal muscle.

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OBSERVATIONS ON CERTAIN DISEASES OF THE TROPICS

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GLOBAL warfare has resulted in many problems of medicine which do not ordinarily concern the practitioner of temperate climes. Certain diseases of tropical distribution have been prevalent amongst American and Allied Forces of the Pacific. Some of these, due to the recurrences and sequelæ, will be of considerable importance in post-war days. Other diseases of military significance such as bacillary dysentery, and infectious epidemic jaundice, are common to almost all climates, and will present few serious after-effects. Still others such as amœbiasis, and amœbic dysentery, although considered as diseases of the tropics, occur frequently in temperate regions, and are familiar to most physicians. It is believed that a discussion of a few of the common diseases primarily of subtropical and tropical distribution may be of interest. A recapitulation of our experiences in the Southwest Pacific will perhaps be of value to those Canadian troops who may travel to the tropical regions.

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Malaria

This disease is responsible for an overwhelming majority of medical casualties in the tropics. In the beginning of the Pacific campaign in 1942 the casualty rate was such as to seriously menace military operations. Proper control measures were not available, and in a way paralleled the situation found in the Middle East and Gallipoli, during the last war. Great credit is due to the Allied Medical and related services for bringing order out of chaos.

In the first Papuan campaign the casualty rate, both primary and relapse, was tremendously high and at times exceeded 100% in certain groups Control measures were of necessity incomplete, and quinine was used as a suppressive drug. Perhaps one important factor of this unsatisfactory condition was the unpopularity of quinine. The troops complained of the bitter taste, and the consequent tinnitus interfered with the proper identification of the night sounds of jungle warfare. The whole situation was most discouraging, since malaria was endemic and hyperendemic in practically all future areas of penetration of the Japanese perimeter, except for the islands of the Central Pacific.

During the first New Guinea campaign it was realized that radical changes were necessary to combat the problem of malaria. Malaria Survey and Malaria Control Units were formed; atabrine became available, and its proper intake and administration were enforced; and in a relatively short time quite satisfactory results were achieved. Not only was the situation improved at forward bases, but also amongst combat personnel. The Survey and Control units went in to the new beachheads with combat troops and obtained remarkable results in the control of the anopheline population. Insofar as the individual was concerned, he was given atabrine at the mess and made to swallow the tablet in the

presence of a non-commissioned officer; long sleeves and leggings were compulsory; and individual bottles of dimethylphthalate repellent were issued to each man; the use of bednets was enforced when the tactical situation permitted and aerosol-pyrethrum bombs became obtainable. The use of head-nets and gloves was found to be impractical.

In regard to the suppressive dosage of atabrine, it was soon seen that 0.3 gm. a week as used for some time in the Middle East was of little value, and the dosage was increased to 0.6 gm. a week. However, the atabrine barrier of this latter dosage was often broken through during periods of combat stress and strain, with its consequent extreme physical exhaustion. Some units therefore increased the dosage to 1.0 gm. a week or even higher. In actual combat the supervision of atabrine intake is difficult, but it is believed that malaria will almost never appear if 1.0 gm. weekly is actually taken, no matter what the environmental situation may be.

Benign tertian, or Vivax malaria has been and still is our main problem due to its tendency to relapse, and its ability to break through the atabrine barrier unless the latter is scrupulously maintained. Its appearance after long periods of suppression is troublesome, and may occur months after atabrine has been stopped. This behaviour of the parasite will result in a major problem when so many thousand seeded cases will be returned to North America at the end of the war. Unfortunately, a truly prophylactic agent is not available since atabrine, quinine, and plasmochin are primarily suppressive, and not sporozoiticidal. Considerable research is now being done on the probable exoerythrocytic cycle of *Plasmodium vivax,* but in the meanwhile, our only weapons are schizonticidal and gametocidal.

Malignant tertian malaria, caused by *Plasmodium falciparum,* acts in a different manner, being more susceptible to atabrine. It rarely appears unless the individual stops suppressive treatment within four weeks of the time of infestation. Once treated, it seldom reappears without reinfestation. The writer found that in about one thousand slides examined in relapsing cases which had been in a non-malarial area four to six months, only four showed *P. falciparum.* Other workers have had similar experiences. Malignant tertian will be rarely encountered in returning service personnel.

Quartan malaria has been rare in this area and we have had only sporadic cases. A few cases of malaria caused by *P. ovale* have been described.

In the tropics, it is wise to consider all fevers as malarial until a blood examination can be done. In the case of unconsciousness, the cause of which is not immediately ascertainable, the patient should be treated as a case of cerebral malaria, with parenteral quinine or atabrine, and therapy not delayed for the results of the microscopic examination.

As mentioned above, the majority of patients are of benign tertian type. These will report to the medical officer complaining of severe headache, backache and a shaking chill or a burning fever. The peculiar gray and drawn facies is quite typical. A history of a mild chill and malaise occurring two days previously is common, as is also an antecedent history of an upper respiratory infection. Inquiry usually reveals negligence of atabrine intake. In rear areas, an alcoholic debauch often precipitates an attack. It is not intended to dwell at length on symptomatology which at times may show numerous variants, but the above findings plus a palpable spleen are in most cases sufficient for a diagnosis of benign tertian malaria.

Patients with malignant tertian may present similar findings, but they usually appear more toxic. It must be remembered that this is a protean disease and often lethal unless recognized. Cerebral, cardiac, gastrointestinal, pulmonary and algid forms may be seen. The underlying pathogenesis is due to the clogging of the capillaries and small vessels with the parasitized cells. This localized intravascular collection occasionally results in a disappearance of the parasite from the peripheral blood stream. Hence malignant tertian may pose a diagnostic problem, and if suspected, should be treated without delay even if a negative smear is obtained.

Excessive use of therapeutic doses of atabrine has apparently not resulted in a lower relapse rate in benign tertian. The routine treatment of any case of uncomplicated malaria at most naval activities has consisted of atabrine 0.2 gm. q. 6 h. for five doses followed by 0.1 gm. t.i.d., and then 0.1 gm. daily for an

indefinite period. In the case of persistent vomiting, it may be necessary to give atabrine intramuscularly for the first few doses. In the case of severe malignant tertian with cerebral manifestations, the drug of choice is intravenous quinine dihydrochloride 0.5 gm. every four hours until consciousness is well regained, then atabrine may be taken orally. Intravenous quinine must be given slowly, preferably in a saline infusion. In the field, it has been given in 10 c.c. of sterile water with no ill effects. In this example, the injection should be of at least fifteen minutes' duration. Except for this type of case, quinine is seldom used. Plasmochin has been discarded because of its toxicity.

In seeded troops returning to a non-malarial area, the discontinuance of suppressive therapy should be staggered amongst various groups in order to prevent undue crowding of hospital facilities.

Symptomatic treatment is occasionally a problem, especially with marked hyperpyrexia. Intravenous fluids are often indicated, and when given to a dehydrated patient will usually result in a prompt fall of fever. One grain of codeine may make the patient more comfortable, and seems to help in lowering the pyrexia. Ice bags, if available, find good usage. In benign tertian, an afebrile course may be expected after 48 hours of treatment, but with malignant tertian, the patient may remain constantly febrile for four to six days.

The microscopical diagnosis is not difficult, but may require as many as three examinations in some cases. The optimal time for type diagnosis is about twenty-four hours after the initial rigor. The use of adrenalin injections to increase the peripheral parasite count is, in my opinion, without value. There are no substitutes for a careful microscopic examination. Leucopenia with left shift and a moderate to increased mononuclear total will be found in the early phases of the disease. Considering microscopical techniques, we have found that the thick film is by far the best. A conventional thin blood smear may be made on the other end of the same slide. The thin film may clear up doubtful morphological distinctions of type, but an experienced microscopist will seldom find this necessary. The Field stain for thick films is the most efficient method, and gives excellent results; the conventional Romanowsky stains may be used on the thin film.

Many millions of atabrine tablets have been taken and as yet there has been no demonstrable evidence of the liver damage that was once so feared. Mild toxic symptoms of gastrointestinal disturbances are rare and these usually disappear if the individual is forced to continue intake of the drug. It is my opinion that atabrine is superior to quinine in most respects, except as in the cases noted. One objection to atabrine is the yellow skin pigmentation of temporary nature. However, the complaints have come largely from female personnel. The legend that atabrine produced impotency and sterility is dying out. This myth was started by Japanese propaganda at the time when our troops first started to use suppressive atabrine.

The most important factor in the control of malaria is the avoidance of the bites of infested mosquitoes by every means possible. Other factors are of secondary importance.

TSUTSUGAMUSHI FEVER

This disease is a typhus-like infection which has numerous names in various localities, but the infective agent, *Rickettsia orientalis,* is probably common to all. Amongst the other names are scrub typhus, tropical typhus, Mossman fever, Kedani and Japanese River fever. It is endemic in sections of Japan and extends as far south as Malaya, the Indies, and northern Australia, and eastward almost to the border Melanesia. It is caused by the bite of an infected larva of certain trombiculid mites. The disease is serious and has occurred in almost epidemic proportions in numerous areas and campaigns, and will be met with in most future theatres of war. Farner and Katsampes have recently made an excellent epidemiological survey.

The mortality has ranged from 2 to 40% in different areas. The virulence of the strains is apparently quite variable. The distribution of infected mites is often sharply localized. One small island may prove to be a deadly spot while an island a few thousand yards away may be completely free of disease. The habitat of the mite is in rotting vegetation, overgrown clearings and in the tall kunai grass. The only way to obliterate the focus at a specific spot is to clear the land and burn it over. Combat troops may largely avoid infection by the proper application of dimethylphthalate insect

repellents. An emulsion of repellent and soap is used to impregnate leggings and clothing necessary for the jungle campaign. The clothing thus treated will remain effective for about two weeks. The co-operation of the individual in the proper use of repellent is of utmost importance.

The disease has an incubation period of one to three weeks. Prodromal symptoms of headache and general malaise are followed in a few days by the onset of fever of moderate severity and the patient usually appears quite ill. A characteristic ulcer will be demonstrated in the majority of cases, and consists of a 2 to 10 mm. punched-out lesion with a central black necrotic eschar surrounded by an erythematous areola. This ulcer is the original site of entry of the infection and is caused by the bite of the larval mite. It appears in the soft folds of skin and at points of clothing constriction such as the ankles, lower legs, along the belt line and in the groin and axilla. General lymphadenopathy can usually be shown as well as enlargement of the lymph glands central to the ulcer. The spleen is usually palpable. As the disease progresses, a generalized erythematous maculo-papular exanthem will appear by the end of the first week in most cases. A continuous fever of 101 to 104° is constant for two to three weeks and then falls by lysis. In milder cases a lower fever of shorter duration is found. As time goes on, the patient will appear more acutely ill. Tachycardia is not uncommon in conjunction with a lowered blood pressure. Slight cyanosis and evidences of pneumonic involvement are usually present, as also are headache, nuchal rigidity and occasional delirium.

Early clinical diagnosis may be difficult in the absence of the typical eschar and at times must be made by exclusion, considering especially malaria, dengue, and the enteric fevers. A positive Weil-Felix reaction with *B. proteus* OX-K is almost invariable in this disease. If the titre is low on the first examination, a second determination should be run in a week's time. The red cell count is unaltered, but there will be a leucopenia with a relative increase of lymphocytes.

At the present time there is no specific treatment for tsutsugamushi fever. Careful nursing, adequate fluids and nourishment are the most important factors for a good prognosis. Immune serum and sulfonamides are without effect, as is penicillin. In the shock-like state of the disease so frequently seen, the administration of plasma is of great benefit. A lengthy convalescence is advisable, with a gradual return to full activity.

Cardiac sequelæ have been feared but there is increasing evidence by various workers that there is little or no permanent damage. Levine recently investigated 115 convalescent cases from a cardiovascular standpoint, both clinically and electrocardiographically, and was not convinced of evidence of persistent myocardial changes. He states that in its effect on the heart, it rather resembles diphtheria. Signs of poor vascular tone, however, may be quite prolonged.

Other sequelæ include partial or more rarely, complete nerve deafness, but these have a fair prognosis. Complete blindness has occurred as well as have organic mental changes; unfortunately, no information is available on the ultimate outcome of these cases. Unilateral foot drops and atrophy of some of the shoulder girdle muscles have been observed following mild febrile illnesses. These observers have laid the blame on tsutsugamushi fever.

SCHISTOSOMIASIS

This disease, caused by a trematode, *Schistosoma japonicum*, first appeared in the Pacific area upon the invasion of the Philippines. As the war moves into new theatres the disease will continue to be a hazard to Allied forces. The distribution of the parasite ranges from Japan down through China where millions are infested, to involve at least four of the Philippine Islands. It has been reported at the Burmese border and also in the Celebes. So far as is known, Java and Sumatra are free of the disease.

The life cycle of the fluke is as follows: The ova of *S. japonicum* are passed out in the fæces, if the fæces come into contact with fresh water, the ova hatch into miracidia, enter the appropriate molluscan host, multiply and emerge as cercariæ which penetrate the skin on contact. These cercariæ migrate via the blood stream through the right heart and lungs, and those that find their way to the liver mature into adult worms and travel down the portal system to the small venules of the upper mesenteric vessels. Within five weeks the parasites are mated and the female is laying eggs. Some of these eggs are carried to the liver or eventually may be lodged in the brain or other organs.

A large proportion of the ova rupture through the intestinal wall and are passed out in the fæces to resume the cycle.

Various species of *Katayama, Oncomelania,* and *Schistosomophora* are the molluscan hosts. These are tiny (1 to 4 mm.) conical, operculate, amphibious snails which live in rice paddies, swamps and along the banks of streams. Remaining near the water's edge, they are none the less capable of withstanding lengthy dry periods. Unfortunately, man is not the definitive host, but horses, dogs, cattle, pigs, field mice, and other animals form a perpetual reservoir of infestation, hence field control measures are well nigh impossible. Eradication of snails has been attempted with chloride of lime and copper sulphate. The Japanese have used live steam, played over the habitat of the molluscs. Limestone has been suggested in order to diminish the acidity of the water necessary for the growth of the snail. None of these measures has proved satisfactory on a large scale. A cercaria once liberated from the snail can live for only 36 hours in water and is susceptible to chlorine in one part to a million.

Insofar as the individual is concerned, prevention consists primarily of education. Combat conditions sometimes make it necessary for exposure to infested water. Work is now being done on a water-resistant repellent, but it is unlikely to be practical since a muddy infantryman will bathe "come hell or high water".

Faust and Meleney have written a comprehensive monograph on the schistosomiasis of Japan and China. Our problem here is an immediate one and not concerned with the well developed irreversible changes caused by the chronic disease, but rather with prevention, early recognition of the disease, and prompt treatment. Since the entity is new to most of us, it is difficult to make generalizations or to be categorical in any respect.

Hunt has described the symptomatology of our group of cases. The signs and symptoms may be summarized as follows: A few cases recalled pruritus while bathing in a stream, however, obvious symptoms did not appear for two to four weeks after the initial exposure. These included anorexia, general malaise, muscular aches and pains, frontal headaches, fever with occasional chills, a dry cough, some vomiting, complaints of slight "soreness" of the abdomen, and a usual history of mild diarrhœa. The afternoon temperatures were elevated to 103 and 104°, and after a few days, marked weakness was common. Nocturia and frequency were noted. Fleeting episodes of transient angioneurotic œdema appeared which affected the eyelids, lips, hands, and penis. These were accompanied by large and giant patches of urticaria, which showed a central pale area with marginal erythema. The urticaria lasted from a few hours to a few days, and reappeared over a period of three weeks. The average time of appearance was six weeks after the initial exposure. In most cases a slightly enlarged liver and spleen were found.

The red cell count was normal. A leucocytosis with eosinophilia was constant. The latter was invariably 40% or higher, and in one case, reached 87%. The definitive diagnosis was made by the examination of fæces.

In regard to fæcal examination, a number of techniques are available. The direct smear and sedimentation method are fairly satisfactory, but it is my belief that a modification of the Faust technique for the hatching out of miracidia is superior in that larger samples of fæces are used. The latter procedure is macroscopic, has given excellent results, and is specific for the diagnosis of schistosomiasis. It should be remembered that during and following treatment, dead ova will be passed, but the presence of ova in the fæces a month after the termination of treatment is an indication of relapse. Thus, if the fæces are found to be positive on the first diagnostic investigation it is not necessary to run another test until a month after the completion of treatment.

In addition to symptomatic therapy, a fairly specific drug is available. This is fuadin, a trivalent antimony compound. The scheme of treatment has consisted of 1.5 c.c. injected intramuscularly the first day, followed by 3.5 c.c. and subsequent injections of 5.0 c.c. on alternate days for a total of 70.0 c.c. After the first five injections, most of the patients have shown subjective and objective signs of improvement. This regimen of treatment has been fairly satisfactory, but a few relapses have occurred. It is believed that daily injections of similar amounts will give better results. Symptoms of antimony toxicity included arthralgias, paræsthesias, and urinary findings of red and white blood cells. These were transitory.

It should be mentioned that routine stool examinations have revealed the presence of ova in asymptomatic individuals. On the other hand, severe cases are occasionally seen. In an analysis of over 400 cases at an Army activity, 50% were graded as mild, 30% moderate, and 10% each as asymptomatic and severe. Cerebral involvement may be seen in the latter type of case, which may result in disorientation, monoplegia, hemiplegia, spasticity, and other manifestations of disturbance of the pyramidal tracts. Sensory paræsthesias have also been reported which seem to be independent of treatment.

Lassitude and marked tendency to fatigue are seen for some time after treatment. Insofar as permanent sequelæ are concerned, the fibrosis resulting from schistosomiatic abscesses caused by the wandering ova is important. The characteristic fibrotic lesions occur in the bowel wall and in chronic cases constitute a marked disability. A hepatic cirrhosis may develop, and a picture similar to Banti's disease will be encountered. The information available at present shows an encouraging prognosis for acute central nervous system lesions.

It is not expected that schistosomiasis japonica will be the cause for much worry after the war, since it is only in the chronic, untreated cases that irreversible fibrotic changes occur. Adequate bathing and laundry facilities, education for prevention, the early recognition of the disease with prompt treatment afford an effective safeguard for the Serviceman.

DENGUE

A few words should be said on this bothersome and sometimes incapacitating disease. It is widespread, and endemic throughout most of the subtropical and tropical regions of the world, and is important in that it may assume epidemic proportions. Prevention has fallen largely to the malaria control units and they are usually able to predict when an epidemic is imminent by observing the population of the principal vectors, *Ædes ægypti*, and *Ædes albopictus*. Bed-nets, repellents, long sleeves and trousers are important to the individual.

The incubation period averages five to six days. The prodromal stage, if present, is commonly six to twelve hours and is of mild character, consisting variably of backache, headache, indefinite muscular pains, depression, anorexia, alterations of taste sensation, and bowel disturbances. A sudden onset may be quite dramatic, occurring in a matter of minutes. These symptoms of onset consist of severe retrobulbar headache, pain on eye movement, muscular pains, prostration and occasionally a rigor. The classical saddle-back five-day fever frequently occurs, but as Lumley has stated, there is no characteristic form of fever in dengue. Fever seldom reaches 104°. The "breakbone" type of pain is rare. Conjunctival suffusion is universal. An evanescent rash often appears on the third or fourth day, usually mild and of maculopapular type. A scarlatiniform type of rash is occasionally seen. Splenomegaly and hepatomegaly are uncommon. A bradycardia is usually present and may persist for some days following the defervescence. Sequelæ of temporary depression and lassitude for a week or more are often encountered. Blood examination shows a leucopenia with relative lymphocytosis.

The treatment is purely symptomatic, and permanent sequelæ are practically unknown. Immunity, if present at all, is short lived and only partial.

SUMMARY

A discussion and a recapitulation of experiences in the field concerning certain diseases of the tropics are presented. The diseases mentioned are malaria, tsutsugamushi fever, schistosomiasis, and dengue.

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35 The Uplands.

RÉSUMÉ

Les troupes américaines du Pacifique ont eu à combattre activement les maladies tropicales, notamment, la malaria, la fièvre dite tsutsugamushi, la schistosomiase et la dengue. Contre les diverses formes de malaria la seule prophylaxie consiste à éviter les piqûres d'anophèles. L'atabrine est le médicament de choix; exceptionnellement la quinine a ses indications. La fièvre tsutsugamushi, dûe à la *Rickettsia orientalis*, est caractérisée par l'escarre profonde à l'endroit de la piqûre; son traitement est essentiellement symptômatique. La schistosomiase, causée par le *Schisto-*

soma japonicum se contracte par contact cutané. Les mollusques sont les hôtes intermédiaires. La fuadine à doses progressives a de bons effets. Maladie aussi fréquente que la malaria, la dengue est annoncée par la recrudescence de ses vecteurs habituels, l'*Ædes Ægypti* et l'*Ædes albopictus*. La symptômatologie est capricieuse et le traitement symptômatique. La guerre aura fait connaître davantage certaines maladies tropicales et fait progresser la prophylaxie de la parasitologie. JEAN SAUCIER

THE PRESENT STATUS OF THE STANDARDIZATION OF DIGITALIS AND STROPHANTHUS PRODUCTS IN CANADA

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MANY publications from authoritative sources have stressed the importance to the public and medical profession of having digitalis products of uniform potency.[1 to 5] Just within the last few years several publications have outlined the dangers involved when physicians administer preparations which are improperly standardized.[5, 6, 7]

Canada as well as other countries has recognized the importance of properly standardized digitalis products and formulated control measures in the revised Food and Drugs Act of 1927. On account of the work leading up to the adoption of the over-night frog method as the official method of assay for the standardization of digitalis and strophanthus preparations in Canada was outlined in a previous publication.[8] For many years this method of assay was considered to be fairly reliable.[9] In a recent collaborative study conducted by the U.S.P. Digitalis Committee the over-night frog method was found to be a more accurate method than the U.S.P. XI one-hour frog method.[10]

During the past three years new evidence has been presented which shows that the frog method of assay for digitalis products, particularly tinctures, does not give a true indication of the clinical potency of the sample.[11, 12] Tinctures which were reported to be U.S.P. XI strength have been shown to vary by as much as 300% when they were assayed by the U.S.P. XII cat method.[11] Moreover it has been shown that tinctures assayed on human subjects were more nearly in agreement with the potency found by the cat method.[11]

It seemed advisable in view of this new clinical evidence which had the support of several heart clinics in the United States, to assay samples of powdered digitalis leaf, market tinctures and some glucosidal preparations from various sources and find out just what the differences would be between the U.S.P. XII cat method and the over-night frog method for these products sold on the Canadian market.

The purpose of this paper is to present a brief report on these comparative assays and discuss our responsibility as a regulatory body in connection with standardization of these products in Canada.

METHODS

For these comparisons the cat method outlined in the U.S.P. XII and the over-night frog method used for the Collaborative U.S.P. Digitalis Study and described in detail by Miller[10] were followed. The frog assays were all done in duplicate and each assay was given its proper weight according to methods previously described.[13] The standard error of each determination and the per cent difference of the over-night frog assay result from the cat assay result are shown. These differences have been tested for significance and are reported in the tables.

Digitalis leaf samples were obtained from sources in England, Canada and United States. For the most part they represent the sources of supply for powdered digitalis leaf sold on the Canadian market. Most of the tinctures were obtained from Canadian manufacturers.

In Tables I and II are shown the potency of each sample in terms of the international digitalis standard by the U.S.P. XII cat method and the over-night frog method. It is of interest to note that, for 80% of the powdered leaf samples assayed, the difference between the two methods was less than 25%; a difference which most physicians would agree could not be detected clinically.[14, 15] For those powdered leaf samples on which the difference greatly exceeds 25%, an explanation of the cause of the difference cannot be readily determined. It is quite possible that the leaves have not been properly dried and stored as soon as they were picked. The U.S.P. Revision Committee recognized the importance of the moisture content

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TABLE I.

A COMPARISON BETWEEN THE OVER-NIGHT FROG AND THE U.S.P. XII CAT METHODS OF ASSAY ON POWDERED DIGITALIS LEAF

Sample	Potency in terms of Int. Std. Digitalis % ± S. E. cat method	Potency in terms of Int. Std. Digitalis % ± S. E. over-night frog method	% difference of over-night frog assay result from cat assay result	*Difference significant or not significant	Source
1202	71.4 ± 6.3	75.2 ± 1.8	+ 5.3	N S	England
1371	82.9 ± 5.8	72.9 ± 2.6	-12.1	N S	England
1372	99.7 ± 7.7	92.9 ± 2.1	- 6.8	N S	England
1373	80.1 ± 5.5	78.0 ± 2.8	- 2.6	N S	England
1473	89.6 ± 7.0	93.8 ± 2.2	+ 4.7	N S	England
1475	97.6 ± 7.1	118.7 ± 2.8	+21.6	S	England
1477	101.6 ± 9.3	102.6 ± 4.4	+ 1.0	N S	England
1639	111.5 ± 6.8	94.5 ± 3.5	-15.2	N S	England
1676	71.9 ± 4.9	86.3 ± 4.4	+20.0	S	England
1691	96.4 ± 7.2	96.0 ± 5.3	- 0.4	N S	England
1793	96.1 ± 7.7	81.0 ± 3.3	-15.7	N S	U.S.A.
1868	143.9 ± 10.8	146.0 ± 4.9	+ 2.7	N S	Canada
1869	75.2 ± 5.7	44.8 ± 1.9	-40.4	S	U.S.A.
1897	79.9 ± 5.9	78.1 ± 3.2	- 2.3	N S	U.S.A.
1898	76.0 ± 5.8	67.6 ± 2.5	-11.1	N S	U.S.A.
1899	70.6 ± 5.6	61.9 ± 2.5	-12.3	N S	U.S.A.
1900	83.0 ± 6.6	75.1 ± 2.5	- 9.5	N S	U.S.A.
1901	86.6 ± 6.8	79.2 ± 3.0	- 8.5	N S	U.S.A.
1902	84.1 ± 6.2	78.1 ± 2.7	- 7.1	N S	U.S.A.
1135	91.7 ± 5.8	67.1 ± 3.5	-26.8	S	Canada
442	78.1 ± 6.1	64.3 ± 2.5	-17.7	S	U.S.A.
150	136.9 ± 9.1	120.0 ± 4.6	-12.3	N S	U.S.A.
624	73.9 ± 4.4	47.5 ± 1.4	-35.7	S	U.S.A.
151	98.7 ± 3.0	74.3 ± 3.8	-24.7	S	U.S.A.
600	69.9 ± 2.4	40.9 ± 1.6	-41.5	S	U.S.A.
700	79.8 ± 4.4	52.4 ± 2.3	-34.3	S	U.S.A.

*The statistical significance of the differences was calculated using the method described in "Biological Standardization" by J. H. Burn, page 29.

TABLE II.

A COMPARISON BETWEEN THE OVER-NIGHT FROG AND THE U.S.P. XII CAT METHODS OF ASSAY ON DIGITALIS TINCTURES

Sample	Potency in terms of Int. Std. digitalis % ± S. E. cat method	Potency in terms of Int. Std. digitalis % ± S. E. over-night frog method	% difference of over-night frog assay result from cat assay result	Difference significant or not significant	Source
35	99.8 ± 7.4	93.0 ± 2.9	- 6.8	N S	U.S.P. Exper. Tinct.
38	82.0 ± 5.7	66.0 ± 2.3	-19.5	S	" " "
B	118.2 ± 9.6	125.3 ± 7.7	+ 6.0	N S	" " "
1053	107.1 ± 6.1	67.9 ± 4.2	-36.6	S	Market Tinct. 3 yrs. old at time of assay
1082	120.2 ± 8.3	68.0 ± 4.4	-43.4	S	" " " " " " " "
1114	100.9 ± 6.4	52.5 ± 2.9	-48.0	S	" " " " " " " "
1776	54.6 ± 2.1	25.0 ± 1.2	-54.2	S	Market Tinct. not out-dated at time of assay
1777	94.3 ± 4.9	71.0 ± 3.4	-24.7	S	" " " " " " " "
1778	100.7 ± 5.3	48.7 ± 2.1	-51.6	S	" " " " " " " "
1779	186.3 ± 10.7	88.1 ± 3.8	-52.7	S	" " " " " " " "
1781	96.7 ± 7.7	66.3 ± 2.9	-31.4	S	" " " " " " " "
1782	118.2 ± 6.7	60.9 ± 2.2	-48.5	S	" " " " " " " "
1783	103.4 ± 6.1	52.3 ± 4.5	-49.4	S	" " " " " " " "
1789	107.6 ± 5.8	48.4 ± 2.2	-55.0	S	" " " " " " " "
1790	67.6 ± 2.5	47.0 ± 2.3	-30.5	S	" " " " " " " "
1791	76.6 ± 6.0	47.9 ± 2.3	-37.5	S	" " " " " " " "
1792	56.0 ± 3.2	31.1 ± 1.6	-44.5	S	" " " " " " " "
1794	64.4 ± 4.0	43.8 ± 1.8	-32.0	S	" " " " " " " "
1795	117.0 ± 8.8	79.1 ± 3.6	-32.4	S	" " " " " " " "
119	108.1 ± 6.4	35.1 ± 1.7	-67.5	S	Exper. Tinct. 7 yrs. old
120	90.9 ± 4.8	33.7 ± 2.0	-62.9	S	" " " "

and established an upper limit of 5% for powdered digitalis.

For all the tinctures assayed with the exception of four, the differences between the two methods were considerably in excess of 25%. The greatest difference was for tincture 119; the potency by the frog method was about one-third of the potency by the cat method. This tincture was 7 years old at the time of assay. For the market tinctures which were not yet out-dated at the time of assay the differences between the two methods were quite large; they were also quite variable for the two methods. There were some tinctures on the Canadian market which were 3 times as strong as others. Tinctures of digitalis are supposed to contain 1 international unit per ml. but were found to have potencies from 0.35 international units per ml. to 1.22 international units per ml. by the frog method.

Comparison of Methods on Strophanthus Preparations

When the cat method of assay was adopted by the United States Pharmacopœial Revision Committee for digitalis products it was also adopted without further study for strophanthus products. There is published evidence that a mammalian method is quite suitable for the assay of strophanthus tinctures but none of the methods described are exactly the same as the U.S.P. XII cat method.[16] To fill this lack of information a few comparisons were made between the over-night frog method and the U.S.P. XII cat method and the results are shown in Table III. The two methods gave very close agreement for all the products assayed. Ouabain solutions which were prepared 13 years ago had shown no evidence of deterioration by either method. Strophanthus tinctures similarly showed little or no evidence of deterioration by either method.

The British Pharmacopœial Revision Committee adopted a standard tincture of strophanthus to be used for testing tinctures made from strophanthus kombé; they also adopted a standard strophanthin for testing glucosidal mixtures prepared from strophanthus kombé. The Commission recommended the use of these standards after making an analysis of the results of assays on tinctures of strophanthus by several different methods using ouabain as a standard. They concluded that ouabain was not a very suitable standard for the assay of strophanthus kombé tinctures when several different methods of assay are employed, but, when a mammal such as the cat is used the advantage of using a tincture as a standard is less obvious. The results of the few comparisons reported in Table III seem to show that ouabain is a suitable standard of reference for strophanthus products when either of these methods is used. The difference between the two methods for British Standard Strophanthin reported in Table III agrees very well with differences reported by Dr. E. E. Nelson[17] for other strophanthin preparations. This difference is of no real significance, probably not even detectable clinically.

Comparison of Methods on Various Lots of Digitalin (crystalline)

The lots used for these comparisons were obtained from pharmaceutical companies in England, France, Canada and the United States. They were all reported to be relatively pure digitoxin. The results of the assays as shown in Tables IV and V already indicate the importance of the use of a proper standard. When the samples were assayed on cats and frogs and their potencies expressed in terms of the international digitalis standard differences in potencies greater than three times were found, *e.g.*, sample No. 3 was more than 3 times stronger on cats than on

Table III.

Comparison Between the Over-night Frog and U.S.P. XII Cat Methods of Assay on Strophanthus Preparations

Name of product	*C.c. or gm. equivalent to 1 gm. of Int. Std. Ouabain ± S. E. over-night frog method*	*C.c. or gm. equivalent to 1 gm. of Int. Std. Ouabain ± S. E. U.S.P. cat method*	*% difference over-night frog assay result from cat assay result*	*Difference significant or not significant*
Int. Std. Ouabain (1-1000) prep. 1933.....	0.86 ± 0.04 gm.	0.92 ± 0.06 gm.	+ 6.5	N S
Can. Std. Ouabain (1-1000) prep. 1931....	0.84 ± 0.04 gm.	0.82 ± 0.06 gm.	- 2.4	N S
Can. Std. Ouabain (1-1000) prep. Jan. 1945	0.87 ± 0.04 gm	0.95 ± 0.08 gm.	+ 8.4	N S
Ouabain (1-1000) market sample.....	1.28 ± 0.07 gm.	1.06 ± 0.08 gm.	-20.7	S
U.S. Ouabain (1-1000) prep. Jan. 1945	0.96 ± 0.03 gm.	0.95 ± 0.10 gm.	- 1.1	N S
Br. Std. Strophanthin.....	1.55 ± 0.06 gm.	1.92 ± 0.21 gm.	+19.3	S
Tincture of Strophanthus market sample..	221.0 ± 10.7 c.c.	225.0 ± 16.3 c.c.	+ 1.8	N S
Br. Std. Tincture of Strophanthus.....	200.0 ± 17.4 c.c.	222.0 ± 16.2 c.c.	+ 9.9	N S

frogs. But, when sample No. 4 (a lot of digitalin, crystalline) was used as a standard the strength of the respective samples by the cat and frog methods was about the same. It is quite possible that one of the factors causing the differences in potencies was a difference in the rate of absorption of the two preparations from the lymph sac of the frog.

give a patient the same number of international units of digitalin as of digitalis determined in this way.

If all the lots of digitalin (cryst.) which are sold on the Canadian market are in the same state of purity as the ones assayed and reported in Tables IV and V chemical and physical standards should be adequate to ensure uniformity.

TABLE IV.

A COMPARISON BETWEEN THE OVER-NIGHT FROG AND U.S.P. XII CAT METHODS OF ASSAY ON DIGITALIN (CRYST.) PRODUCTS

Sample No.	*Potency in terms of Int. Std. digitalis % ± S. E. cat method*	*Potency in terms of Int. Std. digitalis % ± S. E. frog method*	*% difference of over-night frog assay result from cat assay result*	*Difference significant or not significant*
1	14600 ± 1214	*6178 ± 683	57.7	S
2	12720 ± 1048	....	....	..
3	14850 ± 1259	*4815 ± 268	67.6	S
4	*13031 ± 552	*4671 ± 201	64.2	S
5	12880 ± 827	....	....	..
6	14620 ± 930	....	....	..
7	13830 ± 1131	*4680 ± 289	66.2	S
8	12750 ± 828	*5005 ± 293	60.7	S

*Weighted mean potency.

TABLE V.

A COMPARISON BETWEEN THE OVER-NIGHT FROG AND U.S.P. XII CAT METHODS OF ASSAY ON DIGITALIN (CRYST.) PRODUCTS

Sample No.	*Potency in terms of digitalin (cryst.) No. 4 % ± S. E. cat method*	*Potency in terms of digitalin (cryst.) No. 4 % ± S. E. frog method*	*% difference of over-night frog assay result from cat assay result*	*Difference significant or not significant*
1	101.1 ± 7.5	*109.4 ± 3.1	+ 8.2	N S
2	99.5 ± 8.8	*100.8 ± 2.6	+ 1.3	N S
3	101.8 ± 7.9	*119.6 ± 3.6	+17.5	S
5	106.9 ± 8.4	*102.2 ± 4.2	- 4.4	N S
6	114.4 ± 8.2	*108.1 ± 3.8	- 5.5	N S
7	94.8 ± 6.9	*99.6 ± 5.9	+ 5.1	N S
8	105.9 ± 8.3	*108.9 ± 6.5	+ 2.8	N S

*Weighted mean potencies.

Gold has stated that "different methods of assay yield different results with respect to the relative potencies of two preparations of digitalis glucosides".[11] It does not seem to be the case with the various lots of digitalin (cryst.) reported in Table V. The cat and the frog methods gave potencies which were in close agreement when the standard used was qualitatively the same as the samples tested.

To assay preparations like digitalin (cryst.) on either cats or frogs and express the potency in international units will be misleading to the physician. There is clinical evidence to show that the requirements of digitalin (cryst.) for humans are considerably less than the potency ratio between digitoxin and digitalis on cats would indicate[18] and it would be disastrous to

SUMMARY AND DISCUSSION

For the most of the powdered leaf samples assayed the differences between cat and frog methods were probably not significant clinically. The large differences between the two methods on some of the powdered leaf samples may be accounted for by deterioration of the leaf because of improper drying as soon as the leaves are picked. Provided the leaves have been properly dried and stored as soon as they are picked the potency will probably be the same by the U.S.P. XII cat and over-night frog methods. When tinctures are freshly prepared from good quality leaves the strength of the tinctures will be approximately the same by either method, but on standing, depending on the storage conditions there is some change

that takes place which is detectable on the frogs but not on the cats. Some authors have suggested that the explanation may be due to the fact that the frog method involves absorption from the lymph sac whereas the cat method involves no absorption. That, however, does not alter the fact that some change may have taken place in the glucoside which probably makes it less readily absorbed by the lymph sac or the breakdown products are less toxic for frogs. This latter observation is suggested in some of the reported toxicity values for digitalis glucosides and derivatives.[19]

As far as our present knowledge is concerned one has to admit that real differences do exist between the two methods, particularly when tinctures of various ages are assayed. Which method, therefore, should be used to guarantee to the physician digitalis products of more uniform potency? Both methods have their followers but no clinical evidence has been presented to show that the over-night frog method gives results which are as valid for man as the cat method. If the samples of powdered digitalis leaf listed in Table I are representative of our future market samples in Canada there will be only a few on which the two methods will disagree, but unfortunately the problem of assuring tinctures of uniform potency still has to be considered. Some will say that tinctures are no longer used to any great extent and there is no need to bother with them. However, this is not the case; a survey which was made by this department shortly after the start of the present war, revealed the fact that tincture of digitalis was still dispensed in fairly large quantities.

The clinical evidence of sixty clinics of the New York Heart Association showed that the cat method was preferable to the frog method of assay for digitalis tinctures. They were able to show that results obtained by the human method of assay agreed more closely with the results obtained by the cat method of assay.[11] The clinical evidence of this group was acceptable to the U.S.P. Revision Committee, and the U.S.P. XI one-hour frog method was deleted from the pharmacopœia in favour of the cat method.

In view of this evidence and the results obtained from our own data it seems quite apparent that Canadian pharmaceutical companies should adopt the present U.S.P. XII cat method for the assay of both digitalis and strophanthus products. The collaborative work of the U.S.P. Revision Committee as well as other investigations have shown this method to be reliable and accurate.[20, 21] The change to the cat method would not change appreciably the potency of digitalis leaf products sold on the Canadian market. There would be a slight change in the present factor on the Canadian Standard Digitalis Powder but this difference does not amount to more than 20%. Pharmaceutical companies would be able to control more effectively the potency of tinctures as deterioration is not a problem when standardization is carried out by the cat method (Table VI).

TABLE VI.

DETERIORATION OF MARKET TINCTURES BY U.S.P. XII CAT METHOD

	First assay Jan. 1942	*Second assay Dec. 1944*
Sample No.	*Potency in terms of Int. Std. digitalis % ± S. E.*	*Potency in terms of Int. Std. digitalis % ± S. E.*
1782	118.2 ± 6.7	121.5 ± 3.7
1777	94.3 ± 4.9	102.7 ± 5.1
1791	76.6 ± 6.0	76.1 ± 2.6
1781	96.7 ± 7.7	85.6 ± 8.0
1783	103.4 ± 6.1	119.4 ± 8.5
1794	64.4 ± 4.0	77.7 ± 3.9

Tinctures were stored at 4° C. since the first assays were done. These potencies were tested for significance and the only one that differed significantly was 1794. For frog assays see Table II.

The injectable and oral preparations of digitalis which are chemically reproducible, *e.g.*, digitaline cristallisée, should be acceptable on the basis of chemical and physical standards, but other specialties which are mixtures of glucosides which cannot be reproduced from lot to lot should be standardized by a biological method. We believe that pharmaceutical companies should use a standard similar to the product they are manufacturing until such a time that a national standard becomes available. The importance of marketing preparations of uniform potency cannot be underestimated. The matter of human dosage for these respective products is the responsibility of each pharmaceutical company, and should not be related to other similarly acting digitalis products on the basis of biological assay.

This laboratory has also investigated other biological methods including a guinea pig method, a rabbit method and an embryonic

chick heart method and none of these was found satisfactory for a routine test. The embryonic chick heart method gave results which agreed more closely with the cat method than the guinea pig or rabbit method, but it would be very difficult to accomplish the same amount of work with this method as with the cat method. There was also the local difficulty in obtaining satisfactory eggs. These comparisons will be the subject of a later publication.

To sum up, we believe that Canadian pharmaceutical companies could assure more uniformity in their digitalis whole leaf products, digitalis tinctures made from digitalis purpurea and strophanthus preparations if they would adopt the U.S.P. XII cat method of assay. The cat method could be used for the assay of digitalis specialties which are not reproducible from lot to lot but the reference standard should be a lot or batch of the same material as the product being assayed.

It has been the responsibility of this laboratory to make suitable official methods for testing biological products. It frequently happens that methods have to be changed to fall in line with newer experimental designs and techniques that are developed, and we would be remiss in our responsibilities if our official methods were not changed when new evidence warranted it.

In this particular instance we have waited for two years since the cat method was adopted by the United States Pharmacopœial Revision Committee before proposing that the change be made in Canada. During that time no new evidence has been forthcoming which would cast doubts on the advisability of making the change.

CONCLUSIONS

1. Canadian pharmaceutical companies would obtain more uniformity in potency for both digitalis and strophanthus preparations if the U.S.P. XII cat method was employed to standardize their products.

2. Digitalis products which are not reproducible from batch to batch and for which no national standards are available should be standardized by a biological method, and a standard used which is qualitatively the same as the samples tested.

3. Preparations like digitalin (crystalline) should not be labelled in International Units. The human requirements of digitalin are considerably less than the potency ratio between digitoxin and digitalis on cats would indicate.

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THE TREATMENT OF MYOMAS IN PREGNANCY WHICH ARE UNDERGOING DEGENERATION

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IT is a well known clinical fact that myomas affect pregnancy in two ways. Firstly, they impair fertility, and secondly, favour abortion, miscarriage, or premature labour. The woman with myomas in her womb finds it difficult to conceive, and altogether too easy to miscarry. Every student knows that these tumours may undergo degeneration. In the not too distant past myomectomy was frequently performed on myomas undergoing severe degeneration in pregnancy.

During the past few years I have conservatively treated ten cases of this type. The patients were feverish; the tumour or tumours became very tender, and the pain was severe enough to make them take to bed for five or six

days at a time. The myomas were large enough that the diagnosis was unmistakable. The treatment was expectant, and consisted of rest in bed, heat to the abdomen, sedation, and assurance. Three of these women were in the first trimester of pregnancy, five in the second, and two in the third trimester. One was twenty-three years of age; two were in their late twenties, and the remainder in their late thirties and early forties.

Five patients were delivered *per vias naturales*. Three were afebrile during the puerperium, two were not. One patient had a moderately severe post-partum hæmorrhage. Another had had her appendix removed when she was three months' pregnant. I am inclined to think that the cause of the pain was a tender myoma.

Myomas which have undergone degeneration in pregnancy frequently have adherent omentum. During the labour the omentum may be torn if the tumour is pressed upon. This would result in serious intra-peritoneal bleeding and require immediate laparotomy.

Five patients were treated by Cæsarean section with myomectomy. These were done at term. Myomectomy is an easy operation in the pregnant uterus. The tumours undergoing degeneration, or recently having undergone degeneration shell out of their beds like peas from a pod. Four of these women had an afebrile convalescence. One had a rather stormy time. Two were of special interest.

CASE 1

A young girl twenty-three years of age with two months' amenorrhœa presented herself for examination. The uterus was irregularly enlarged to the size of a five months' pregnancy. During the ante-natal period the myomas underwent degeneration five times. Once the patient threatened to miscarry. At term she was enormous. I delivered her by Cæsarean section. She had twin boys. The weight of one was 7 lb. 5 oz., and the other 5 lb. 6 oz. Three large myomas were enucleated; the largest had undergone extensive degeneration and was adherent to the omentum. The convalescence was uneventful. Shortly afterwards she conceived again, and laparotomy for the second Cæsarean operation was interesting in that there were absolutely no adhesions, nor could any scars be found in the uterine wall. The mother and the three children are well.

CASE 2

Early one Sunday morning Mrs. B., who was five months' pregnant, telephoned her physician. He attended immediately. I saw her in consultation. The woman was forty-one years of age; had been married eleven years, and this was her first pregnancy. She was in great pain, feverish, and the uterus contained multiple myomas—one was very tender. She improved under expectant treatment of rest, heat to the abdomen, and sedation. During the remaining months she had many attacks of a similar nature, and on two occasions threatened to miscarry. The uterus was emptied at term by Cæsarean section, and myomectomy was performed. After a few "stormy days" she made a splendid recovery and left hospital on the sixteenth day with the babe in her arms.

SUMMARY

Ten cases of myoma undergoing severe degeneration in pregnancy are presented. The commonest type is a red degeneration or a necrobiosis. The tumour becomes enlarged, painful, and very tender, and fever supervenes. It is felt that there are several reasons why in most, if not all cases, the treatment should be expectant. As a matter of common experience the majority of women whose wombs are the seat of these troublesome tumours on the rampage, pass through pregnancy, labour, and the puerperium without any great discomfort or serious trouble. Moreover, I think it must be remembered that any operative interference with the tumour during the pre-natal period, apart from hysterectomy will probably lead to a miscarriage. The operation of myomectomy on the pregnant uterus is not without risk, in that it imperils the life of the mother and the unborn child, and to imperil the life of the child will in most cases of myomatous uteri mean destroying any further chances of future fertility. Surely this is ample justification for the conservative treatment of myomas undergoing degeneration in the pregnant uterus.

Medical Arts Bldg.

MEDICAL EDUCATION FOR 1980

By William C. Gibson, M.D., C.M.

Ottawa

"There are plenty of 'M.D.'s' in the world: there are not enough good doctors. It is not so hard to make students know about disease; it is hard to make them care about it."

Alan Gregg.[1]

IT comes as a shock to many medical men to realize that the students entering medical school in 1945 and qualifying in 1950 will have to be basically equipped to practice until 1980 as a minimum.* The thirty-year period of medical practice implied in this figure is per-

* The U.S. Public Health Service has recently estimated the life expectancy of a doctor at age 25 to be 42 years, over 39.4 years of which he will be gainfully employed, but in "full service" only 27.7 years. At age 30 life expectancy is 37.6 years, the remaining years of gainful employment are 35.1, with 26 years of "full service" being the average.

haps conservative in the light of the present situation in medicine generally. In 1943, two-thirds of Vancouver's general practitioners were over the age of 45.[2] In 1944, 45% of Saskatchewan's doctors were over the age of 55.[3] The number of doctors over the age of 65 who are carrying the burden of civilian practice in the present wartime emergency is too well known to require comment. They would be the first to support any move in our medical schools designed to provide our entering medical students with the type of basic training which will stand them in good stead until at least 1980.

We may ask ourselves what is currently offered to medical students which will enable them to arrive at age 60 or 65 as highly respected for their professional skill and knowledge as they were in the early golden years of practice. What new type of curriculum, if any, will satisfy this need? What material in the present curriculum can be discarded to make way for something of more lasting value? Are there methods of selecting medical students and teachers who will retain their intellectual vigour and elasticity through the years? If there are such methods, now is the strategic moment to unearth them and to apply them.

Never before has there been such an urgent need for stocktaking in medical education. How many of our teaching methods are very far removed from Victorian times? How many of our courses can stand up to the scientific scrutiny of 1945, let alone that of 1980?

These problems merit the sober reflection of every medical man today. In addition there are educational problems facing doctors as never before,—in particular, that large body of relatively recent and hastily trained graduates now in the armed forces. The educational future, for many, is a concentric enigma. Both teachers and students are wondering how the four to five years spent in medical school can be made of more fundamental and less ephemeral value.

Osler would sigh if he were to see the inroads which specialist subjects have made in the curriculum today. In the last twenty years there has been a 100% increase in these subjects in the major American colleges.[4] The tendency to particularize and atomize knowledge has outrun the tendency to correlate and pool knowledge into useful working forms. Centrifugal forces in medical education have overshadowed centripetal, to the confusion, overwork and discouragement of the student.*

Let no one imagine that clinical teachers have been solely responsible for this tendency. We need only recall the bulk of useless "didactic" physiology which plagued our earlier student years. Most "didactic" course were rarely anything but dogmatic courses. Progress is made in a totally different atmosphere from that of lugubrious monologues on theories long since disproved. What has "quiz-kid" anatomy done for either medicine or surgery? Good teaching is hard work. The easier path of medical "dictation" sessions has been followed too regularly to leave much spark of interest in the real substance of medicine—the patient. Term-end regurgitations of ill-digested matter rob good students of their self respect, to say nothing of their respect for medicine.

The real question which must be answered by medical educators, both clinical and preclinical is this: "Do we want our students to leave medical school looking upon their textbooks as their patients, or seeing their patients as their true textbooks?" If we could get the student to the patient early, no other object of study would ever cloud the student's mind. The present tendency in medical education has led to the production of a flood of halting practitioners whose effectiveness is lost in pitting an acquired photographic memory for the printed page against the raw material of medicine, *i.e.*, the patients.

One wonders if generations of physiologists sitting pithing frogs have ever raised their eyes sufficiently above the window sills of their laboratory to see, across the street, the world's greatest laboratory—the general hospital. Some have done so, and have promptly replaced the study of frogs by something more nearly human. The most progressive have taken their students to the wards and the outpatient clinics, sometimes to the annoyance of a rare clinical Philistine or two. Anatomy begins to live for the freshman who has been so fortunate as to be on hand in the emergency room of a large general hospital when a crash case is brought in. The "spot" anatomy which he learns at that mo-

* An account of the notable work of Dr. James A. Greene and his colleagues at the State University of Iowa College of Medicine in combating this centrifugal trend is shortly to be published in the *Journal of the Association of American Medical Colleges.*

ment is not, perhaps, very much or very important. The value of such an experience lies in quite another direction: the student feels his *need* of anatomical knowledge, in order that he may meet the *need* of the injured person.

As Alan Gregg has put it, it is hard to make students "care" about disease. This is so, and will remain so until we give them more to "care" about than frogs, cadavers and test-tubes for their first two years of medicine. The good physiologist and the good anatomist know this, and valiantly try to keep the live, human side of their subjects before their students. It is, however, of little comfort to either student or teacher to know that some examiners still take a taxonomist's view of anatomy and an encyclopædist's view of physiology. Such people do a great disservice to medicine, for they fail to realize that the truth and relevance of today may be the untruth and irrelevance of tomorrow. Students in first and second year medicine rightly claim that they are entitled to something better than "death warmed up".

However, the future of medical education is bound up with more things than the curriculum. Consideration must be given to the important problem of providing adequately trained young teachers and leaders in research. Over a period of time, they can only be recruited through guaranteed adequate remuneration and academic freedom. The easily solved problems in medicine have been accounted for. In the future, research will become more and more costly, and subsidies, either public or private, will be increasingly difficult to obtain merely for the asking. No governments and no foundations are willing to underwrite medical mediocrity. Those schools which are not ready to go ahead to something better after the war will be closed by force of circumstances.

The greatest need in medicine today is for thinkers. If students can be stimulated to think about health and its undoing in human beings, rather than about the artificially induced antics of cats, dogs, hogs and frogs, a new type and calibre of graduate will result. The present disastrous provincialism and pettiness current in medicine on this continent will then wither and die. Teaching positions must be filled by open competition, and clinical teachers and tutors must be selected because they are clinical scientists.* A free interchange of ideas and students between the major medical schools is to be encouraged. Deanships and professorships should go to men whose horizon has been widened by several years of solid study abroad in other intellectual climates. We need to be reminded of the fact that when "The Big Four" set out to build Johns Hopkins Medical School not one of them was forty years of age!

A most significant study on medical education has recently been published by an Inter-Departmental Committee set up by the Ministry of Health in Great Britain.[6] Among other things it commends Oxford's plans for the development of "a small clinical school, the aim of which will be to cater specially for men and women students who can be expected to become teachers, investigators and consultants. . . ." The report adds, "It is hoped that in making the experiment the University would revise freely and critically the *whole* of the curriculum".

While it commends Oxford's initiative in this branch of medical education, the Committee emphasizes the need for a medical curriculum which will "take proper account of the types of problems that most frequently face practitioners in general practice". The committee urges that "due regard be given to the scientific foundation and framework of medicine", that students should spend six months during their undergraduate training in residence in hospitals, that the General Medical Council of Great Britain should initiate "a drastic overhaul of the medical curriculum", and appoint inspectors of medical schools.

The thoroughly democratic proposals of the British Committee are so relevant to the Canadian scene that some of the outstanding conclusions may well be quoted:

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* As Professor Seddon writes: "In almost all medical schools the chief, in some the only, defect is the abandonment in the wards of the lessons learned in the preclinical departments and even of the habits of thought that inform the scientific pursuits of the early years. Yet when the postgraduate stage is reached, no progress, except in diagnostic acumen and technical proficiency, is possible without constant reference to the basic sciences. We are agreed that our aim is the scientific advancement of medicine. We could, therefore, plan a school for teaching medicine in such a way that clinical work is a natural continuation of all that has gone before. . . . That there are scientifically minded young clinicians in every school is common knowledge, but they exist in virtue of their innate tendencies rather than because their development has been encouraged."[5]

"Unsuitability for a medical career should be the sole barrier to admission to a medical school."

"It is recommended for Government decision that the payment to any school of Exchequer grants in aid of medical education should be conditional upon the school being co-educational and admitting a reasonable portion of women students."

"Every possible step should be taken to see that all hospital appointments for qualified practitioners are filled by open competition and that the sex of the applicant is not a bar to appointment."

"Medical schools should have more adequate funds at their disposal for the following purposes: (i) to help medical students who are faced with the prospect of having to break off their studies on account, for example, of the financial failure or death of a parent; (ii) to encourage medical students of outstanding ability to interrupt their medical course in order to devote an extra year to the study of anatomy or physiology; (iii) to encourage graduates in other faculties* to study medicine."

This excellent report of 313 pages will well repay detailed study, for it does demonstrate the British genius for getting down to essentials, right in the middle of a war. There is an obvious concern in Britain, perhaps less marked in America, for the future health of the people as a major national asset about which something must be done, and will be done. In this country we are annually exposed to the "free enterprise" pollen, spread by consultants in lucrative urban practices, but in general there is a growing realization by many doctors, that medicine practised co-operatively is better than medicine practised competitively. It has been amply demonstrated in group clinics that medical practice need not be a race between coronary thrombosis and an old age pension. Medical schools should no longer have to apologize for their emphasis on preventive and co-operative medicine, as against conventional and competitive medicine.

Stocktaking in medical education is but a forerunner of stocktaking in the field of medical practice itself. Laymen are not alone in asking—"What total impact is medicine making in the field of health and disease today?" We are living in one of those periods in history where there is a commendable anxiety to balance the books, in order to see where medical science is winning and where it is losing in the constant war against disease. Textbooks of medicine often reflect the state of the conflict. In Osler's time, typhoid fever was the opening if not the longest chapter in the book. Today psychosomatic medicine may hold the stage in the early chapters. Still in too many textbooks we find a glut of information on certain diseases already conquered, but a depressing paucity of material on such scourges as rheumatic fever.

Textbooks for teaching purposes may survive another generation but ultimately they will become little more than reference works. Already the more progressive medical schools are teaching from papers appearing in current medical journals, or from recent fundamental monographs. Even the best textbook is out of date on the day it leaves the press, not to mention the day it leaves a bookseller's shelf on being bought by a student. However, between the current journal article and the omnibus obsolescent textbook, there is a great gap to be filled. Only low-priced monographs, such as those published by the more enlightened Foundations, will reach the student. The need is for twenty-five cent "classics of medicine", starting, as Sigerist suggests,[7] with the early fundamental medical writings, but including particularly the most modern accounts of medical research and practice, written especially for students by the best teachers in the field.

Teachers in medical schools must come to the aid of their students in selecting the current papers worth reading, for there are over 200 medical journals published annually in the United States alone,[8] not to mention the flood of medical periodicals from the rest of the English-speaking world. Surely there are enough progressive medical teachers in these countries to stand behind a few of the really first class journals willing to issue modern medical classics for students. As Davison has pointed out, the average student is expected or encouraged to buy $250.00 worth of medical books during his course.[8] This would buy him one thousand of the twenty-five cent classics proposed above. What more would a student need than a few hundred of these, and what more would he ever have time to read? Textbooks have become a fetish among students, and they rarely stop to realize that one-third to one-half of the price paid is taken as commission by the salesman. The padding which has crept into medical textbooks has brought forth the apt remark[8] that "Many of the

* A recently completed survey "Postwar Education in American Colleges and Universities", by Arthur L. Brandon of Vanderbilt University, confirms the last point. In answer to the question, "Do you believe there will be an after-the-war shift in student interest from science, engineering, mathematics, medicine, etc.?" eighty college presidents answered "Yes", to thirty-two who said "No".

medical books published today probably should have remained as articles in medical journals". Although he wrote the greatest textbook of modern medical times, Osler summed it up thus: "A true worker does not want textbooks; he looks to medical literature and monographs".[9] For this reason, if we are to have fewer textbooks, we must have better and broader medical libraries.

The recent British report recommends a compulsory year of internship prior to "registration" or licensure. In addition, postgraduate courses are envisaged for men who have had sufficient general practice to know what they must need in order to round out their education. As a predominantly rural country, Canada must see to it that, as in Mexico, part of each student's internship is spent in a rural clinic. Three things, particularly, will make rural clinic practice more attractive to coming generations: (*a*) air transport of patients; (*b*) postgraduate courses without loss of patients; (*c*) a university connection whereby rural practitioners of a high standard will be preceptors to the interns who come to the country for part of their pre-registration year. The airdromes and emergency landing strips which will be available for air ambulance planes after the war can be imagined when it is realized that more than 1,000,000 miles were flown every day in Canada under the British Commonwealth Air Program.[10] The war has provided us with planes and pilots. The patients in need of their services are legion, and after the war we must advance another step and use the instruments, which the war made available, to democratize our medical services.* We badly need to implement, in the medical field, that equality of opportunity in getting medical care, which has long been more illusory than real in far northern and in most rural areas.

Finally, the path which we follow in medical education will determine in large measure the benefits which medical research will bring to us in Canada, as to all mankind. Research-minded students should not be "suffered" but "encouraged". Students should be able to earn part of the cost of their medical education by assisting in research laboratories in the summer vacation, though money will be the least of their rewards. One of the world's largest chemical concerns aims to spend 1% of its gross income annually on research. Imagine what could be done to improve health in this country if, tomorrow, we were to put into the hands of trained researchers, 1% of the present annual cost of disease to the Canadian people! The basic insulin research of Banting and his co-workers cost less than $10,000. Would we have penicillin for clinical use today if the Rockefeller Foundation had not given Howard Florey the $1,280.00 which he needed in 1936 for apparatus which would help him solve one of the fundamental extraction problems of antibiotics? Few people will believe that the man who has brought such a boon as penicillin into daily use ever needed money to do the basic work. Is not Madame Curie's life at once an inspiration and a rebuke to us? Until medical research is as well supported in Canada as it is in the Soviet Union, how can we expect more than a relatively ineffective handful of our students to consider it as a career? Unless we find good researchers and provide laboratories and funds for them, how shall we ever reduce the colossal and depressing sums spent annually on disease in this land?

A rapidly changing world has laid upon us, as doctors, the urgent necessity of rethinking medical education. If we in Canada are to be true to the best in that noble medical heritage created by such Canadians as Osler and Banting, we must subject our present methods of medical training and practice to an immediate and thorough scrutiny, to the end that merit shall determine entrance to our profession, that equality of opportunity for medical care may know no boundaries, geographical or economic, and that the reservoir of scientific knowledge so necessary to medical progress may be replenished and disseminated by those best fitted, by nature and by training, for this crucial work. The resolution with which we now address ourselves to this task will determine the future of medical education in Canada for many generations to come.

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RÉSUMÉ

Les progrès accomplis au cours des dernières années dans les sciences biologiques, et particulièrement en médecine, ont créé l'obligation d'améliorer à la fois l'étudiant et le professeur. Dès l'abord, l'étudiant devra voir les malades plus tôt et apprendre à s'intéresser à ceux-ci; il devra penser davantage à la maladie qu'au manuel. La médecine a besoin de penseurs éclairés qui puissent orienter ses destinées. Il faut songer que le citoyen a le droit de demander des comptes et de savoir si la profession médicale est à la hauteur de sa tâche. Bientôt nous verrons les manuels disparaître pour être remplacés par des compendiums qui contiendront l'essentiel; la véritable médecine courante sera enseignée à partir de monographies et de travaux récents. Pour parcourir la route toujours changeante et difficile du progrès, il faut de l'argent. Le public doit savoir qu'il en coûte moins pour favoriser la recherche scientifique médicale que pour solder la note du médecin,—à l'échelle de la nation,—lorsque beaucoup de maladies ne devraient plus exister.

JEAN SAUCIER

Case Report

AN AXILLARY TUMOUR

By James B. McClinton, M.B., B.Sc.Med.

Timmins, Ont.

Discommoding large pedunculated tumours were common before this century. Today the female must be more and more without spot or blemish because she is more exposed. The late Victorian lady could have deformed toes, varicose veins, tumours and hæmangioma without the knowledge of her friends.

Today toes must not be deformed; toenails are even adorned. Varicose veins must disappear. Breasts must be augmented or supported. Vaccination marks must be small and hidden on the thigh instead of a large blotch on the arm.

Large tumours inconveniently suspended from various sites are now rare.

De Tarnowsky[1] reports a girl, aged 21, who was "getting fat between her thighs". She had to stop swimming but continued dancing. A tumour from the right labium reached halfway down her thighs.

Johnson[2] discusses the case of a housewife, aged 50, with a pedicled tumour growing from the upper, inner left side of the left thigh. It was the size of a human head. He mentions no inconvenience.

McKenzie's[3] patient, aged 34, carried a thirty-five pound fibro-adenoma hanging from the left breast for two years. A religious revivalist and faith healer did not cure her.

Crile[4] described a girl, aged 13, who carried two huge breasts—adenofibromas—one weighed eight pounds and the other 4.7 pounds.

It is noticeable that these patients are women.

A case referred to the writer by Dr. William McLaren of South Porcupine merits mention. She complained of a "hanging lump" under her

right arm. It started from "nicking the skin" when shaving the axilla thirteen years before. It was pendulous and extended from high on the anterior portion of the axilla to the lower margin of the breast. It could freely swing to and fro with the arm abducted.

The tumour was of medium consistency. The large area of the lower inner side was ulcerated and discharging. Considering its specific gravity she was asked if it would float? "She didn't know" she "wouldn't go swimming" and "had not been in a bath tub for ten years". Swim-

ming was embarrassing and the bath tub unnecessary. She seemed fond of the tumour and would tuck it away each night in a suspensory she had designed of strong cloth. The support resembled a one-breast beret.

I excised the tumour at the base of its pedicle. It was ten inches long, eleven inches in circumference and four and one-half inches in diameter. It weighed one and one-half pounds. The lower part was somewhat spherical. The upper receded into a goose-like neck, which was attached to the skin.

The pathologist reported: "Benign pedunculated fibro lipoma which has undergone ulceration and infection."

A slow-growing pedunculated tumour is really a falling body. In some old books, pictures show them reaching the ground. On request, Dr. E. F. Burton, Director, Department of Physics, University of Toronto,[5] wrote that surface tension tends to make falling liquid bodies perfectly spherical. "The drop is always trying to become a sphere but never succeeding". His department took instantaneous photographs of rather large drops of water.

Other factors influencing the shape of hanging tumours are: gravity, surface tension, elasticity of the skin, circulation, movement, supports or bandages and the content, whether gaseous, liquid or solid.

The accompanying photograph portrays this large inconveniently placed fibroma of thirteen years' duration.

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In general, it seems that much malignant disease is preventable, using that word in its broadest sense, through communal or individual effort leading to the correction of unfavourable environments and habits of life, and to the early recognition and treatment of cases. Knowledge of the epidemiological characteristics of the disease is therefore of fundamental importance in pointing the way to possible factors in causation and in focusing attention upon the differential incidence which falls upon sections of the population.—A. Bradford Hill, *The Practitioner*, **155**: 34, 1945.

Special Article

PENICILLIN IN OPHTHALMOLOGY*

(A Round Table Conference)

F. T. Tooke, M.D., *Chairman*

Montreal

Wing Commander John V. V. Nicholls, R.C.A.F., made some introductory remarks on "Penicillin — how it works and reasons for dosage". He said that we do not know how penicillin works, and the dosage is based on empirical grounds. However, some useful purpose may come from reviewing quickly what we do know about the action of penicillin.

Penicillin when extracted forms a pale yellow to dark brown crystalline material containing 10 to 20% penicillin. The lighter the crystals the purer the penicillin, the dark brown crystals being evidence of impurity. It is obtained either in the form of a sodium or calcium salt. The sodium salt is highly hygroscopic; the calcium salt is not nearly so highly hygroscopic. The crystalline substance, if stored at 5° C. will keep for six months. The purer it is the longer it will keep. Once it is in solution it is more unstable. An aqueous solution kept at 5° C. will lose 10% of its potency every 24 hours. At room temperatures it will disintegrate much more rapidly. It is destroyed by acids, alkalis, antiseptics and oxidizing agents. It should not be used along with hydrogen peroxide, Dakin's solution, heavy metals, etc., but should be prepared in neutral saline or distilled water, and kept cold in the refrigerator at all times, and used within 24 hours.

Penicillin is the most powerful antibacterial agent known. It acts in dilutions to millions. Its exact mode of action is unknown. Unlike other known antibiotic substances (not sulfonamides) it is not a protoplasmic poison. It affects only certain species, and in some species only some strains. The sulfonamides apparently act upon the intracellular enzymes of bacteria which control their metabolism, inactivating them. Penicillin apparently works on the same enzymes but in some other way. It does not kill bacteria. If one places some penicillin in a broth culture one will find that the culture does not become sterile. The bacteria will remain there, slowly decreasing in number, as the bacteria reach maturity and die. What bacteria there are eventually die from old age. Thus, its action is not like that of the sulfonamides.

Penicillin does not affect all strains of the same species to the same extent. *In vitro* sterilization will only occur with most sensitive organ-

* Given at Section of Ophthalmology, Canadian Medical Association Annual Meeting, Montreal, June 13, 1945.

isms. The sensitive and insensitive organisms may be listed as follows:

Acts on:	*Does not act on:*
N. gonococcus	Colon group
N. meningococcus	B. typhosus
Streptococcus pyogenes	B. paratyphosus
Streptococcus viridans	B. dysenteriæ
Streptococcus non H.	Friedlander's bacillus
Staphylococcus pyogenes	B. hæmophilus
Pneumococcus	B. Brucella
Cl. Welchii	Pasturella pestis
Cl. sporogenesis	B. tularensæ
Cl. septicum	V. choleræ
Cl. tetani	M. tuberculosis
B. anthracis	M. lepræ
C. diphtheriæ	Blastomyces
Treponema pall.	Coccidioides
Relapsing fever	Filterable viruses
Actinomyces	Protozoa

Some organisms, for example *B. coli,* produce enzyme which destroys penicillin.

Penicillin has the same extraordinary action *in vivo* as *in vitro.* It acts without impaired action in the presence of body fluids, blood, pus, etc. It does not affect the integrity of tissues or leucocytes. It is absorbed from the gastro-intestinal tract but is rapidly destroyed by gastric juices and intestinal bacteria, hence it cannot be given effectively by mouth or rectum. An effective method of administration is intravenously. By this method it rapidly reaches its full concentration but is practically all gone in sixty minutes. When 15,000 units are given intramuscularly, it reaches its greatest concentration in the blood in thirty to sixty minutes and the blood is free in three hours. Intramuscular doses should be repeated every three hours. The only way to keep penicillin at high concentration in the system is by continuous intravenous or intramuscular drip. It is usually more convenient to administer it intramuscularly at three-hour intervals and this method is very effective. It reaches the tissue fluids rapidly in high concentrations, for example, the aqueous and synovial fluids. It does not get to the cerebrospinal fluid, nor does it reach the pleural cavity, pericardium or peritoneum. If injected into the cerebrospinal fluid it is absorbed very slowly and is still there 48 hours later. In these areas it must be given by local injection.

In four hours 95% of the material has been excreted and 90% can be recovered from the urine. Penicillin is excreted both in the glomeruli and renal tubules.

The new extracts are remarkably non-toxic. Formerly in larger doses one did get some toxic reactions. A useful rule to remember is that the darker the colour and the greater the bulk, the greater will be the reaction such as chills, fever, urticaria and so forth. Reactions are certainly due to impurities.

ADMINISTRATION

(*a*) *Intravenously.*—Useful in systemic infections: 100,000 units are placed in 20 c.c. saline; then 10 c.c. of this solution are placed in 1,000 c.c. normal saline. This latter is given 30 to 40 drops per hour, *i.e.,* 90 c.c. per hour; 100,000 units in 24 hours.

(*b*) *Intramuscularly.*—15,000 to 25,000 units every 3 hours. If painful, put 1 to 2 c.c. of ½% novocaine in with the intramuscular injection.

(*c*) *Local injections.*—Mostly for infection of closed spaces, such as pleura, pericardium, abscess cavities, etc.: 250 to 500 units per c.c., repeated every 24 to 48 hours.

(*d*) For injection into the aqueous it is usually used in concentrations of 4,000 to 6,000 units per c.c. A highly purified product should be used, having a very minimum of 800 units per mgm.

(*e*) *Topically.*—When used as a dusting powder, calcium salts are better, as they are less hygroscopic, and may be used with the sulfonamides—5,000 units of penicillin per gram of whole powder.

Penicillin may be used as an ointment. An ophthalmic ointment widely used in the R.C.A.F. is made as follows:

Eucerin (anhydrous)	℥ iii
Aq. Dist.	℥ i
Penicillin, 28,000 units	

This formula produces an ointment containing 250 units per gram of ointment. In making it up the water is emulsified in the eucerin, and the pencillin is stirred into the emulsion. These procedures should be carried out under as sterile conditions as possible.

Sodium or Calcium penicillin	25,000 units
Oil paraffin	10 gm.
Lanette wax (Sx)	25 gm.
Aq. Dist. add	100 gm.

The paraffin and wax are mixed and heated over a water-bath to 65° C., then the water is stirred in slowly to form an emulsion and allowed to cool slowly. A weighed quantity is taken out and autoclaved at 10 lb. pressure, no vacuum, and then cooled. An aqueous solution of penicillin, 5,000 units per c.c., is then added to give 250 units per gram. Both are stored in the refrigerator at 5° C. These ointments can be expected to keep about three or four days. If more highly purified penicillin is used and sterile techniques are used in preparation, the ointment can be expected to keep about 10 days.

(*f*) For intraocular use, penicillin may be given by iontophoresis. In Great Britain intraocular injection has been the method of choice.

DISCUSSION

Dr. J. A. MacMillan, Montreal:

Through the kindness of Dr. Arnold Knapp, in June, 1943, I saw the experimental work by Dr. Von Solomon at Columbia University, New York, on penicillin by iontophoresis. My first experience in the use of the drug was later with Dr. Elliott in treating a case of gonorrhœal iridocyclitis. The patient got well in a few days; but I told Dr. Elliott that I had seen similar cases get well under ordinary treatment.

In September, 1943, after doing an extracapsular cataract extraction, with peripheral iridectomy, signs of intraocular infection appeared 24 hours after operation. There was pus in the anterior chamber, but the organism could not be detected as the anterior chamber was reformed and it was felt unwise to break down the wound. The cultures from the conjunctival sac previous to operation showed *M. catarrhalis,* as did the second culture after the infection within the eye had appeared. Penicillin was introduced into the eye by iontophoresis, 500 units of penicillin to the c.c., with a two milliampere current for 3 minutes on the first day, and 5 minutes for the succeeding 10 days. The patient made a complete recovery and has today 6/8 vision.

One does not know the organism that was present, but I do feel that the eye was saved by the use of penicillin.

Dr. Nicholls is very conservative in his dosage. We started giving 100,000 units a day, but after talking to Dr. Collip and Dr. Fred Smith, we decided to give larger doses, 500,000 units a day intramuscularly, and to keep it up for a week. This has been carried out in cases of disseminated choroiditis, iridocyclitis, acute and chronic, and corneal ulcers. In one case of recurrent iridocyclitis the condition cleared up in one week, whereas his previous attack had taken two months. We have not as yet been able to determine its effect on the other patients.

Dr. W. G. Fraser, Ottawa:

I shall mention one or two cases out of several cataract operations which went wrong some time after having a good operative result.

A man, aged 81 years, had cataracts in both eyes and was quite blind. I did a cataract extraction in February, 1944, with a peripheral iridectomy, and the patient had 6/6 vision. Nine months later the patient returned saying his eye had been clouded for about a month. He had a very extensive iritis. The anterior chamber was full of pus. I gave him about 100,000 units of penicillin intramuscularly. It took about a week or two for the iritis to clear up, leaving a cyclitic membrane, good vision, and prospects of needling him; but the patient died from a stroke.

Another case was that of a patient, aged 65 years, who had cataracts removed from both eyes in 1941. He was luetic and had inflammatory changes. After the cataract extraction I found punctate dots (K.P.) on the back of the cornea. He had some pain which was helped by the use of sulfanilamide. He finally got well and was discharged from hospital with 6/6 vision. Two days later he developed a quite marked iritis and was readmitted to hospital where he remained for three weeks. He was again given sulfanilamide, hot fomentations, and kept in bed. When he returned home he had to have his family doctor give him something to relieve pain. A month later he was in the hospital again and was given 100,000 units of penicillin a day, and the iritis cleared up in two days. The pain left him and he has been perfectly free from iritis ever since. That was in November, 1944. I have delayed doing a needling to let everything quieten down, but I think his prospect is fair.

To me, penicillin seems to have a great advantage over the other forms of treatment, such as the sulfonamides. It is a definite step in the treatment of these obscure cases, such as iritis, and so forth.

Dr. A. E. MacDonald, Toronto:

In 1943, Surgeon Commander Best spoke about the Fleming treatment, and we had some penicillin ointment made up in the laboratories. We did not want to use eucerin so used petroleum and equal parts of lanoline. We used an ointment containing 100,000 Oxford units per gram.

It is so unsatisfactory in eye work trying to identify the eye organism before treatment. Staphylococcus albus is not susceptible to penicillin. We have had a fair number in the wards of the General Hospital, and have not been able to coordinate the organism and penicillin treatment. Undoubtedly penicillin has saved four or five eyes with severe infections, in which we could not get a diagnosis of the organism or the cause.

Just two months ago, an 81-year old woman developed trouble on the fifth day after an eye operation. On the sixth day there was pus in the anterior chamber and signs of an endophthalmitis. We gave her penicillin 20,000 units intramuscularly every two hours for three days. There was a steady increase of exudate in the anterior chamber, with severe pain. We tried the sulfa treatment for two other days, then finally did an evisceration. We tried to pick up the organism by pressing some fluid from the anterior chamber. The culture showed *Staph. albus.* I do not know if anyone has lost an eye over endophthalmitis from this organism. Certainly it was not susceptible to penicillin or the sulfa drugs, and the eye was lost.

One traumatic case with erysipelas was very definitely going from bad to worse on the medical wards. The lids were swollen and it was impossible to see the cornea. We used penicillin topically, 10,000 units per c.c., and she did very well. We have also found it very good in light conditions, such as blepharitis, etc.

Dr. A. Lloyd Morgan, Toronto:

At the Hospital for Sick Children we do not find bacteria in the eye if the specimen is not transferred right from the eye to the culture fluid, as it dries out quickly and gives a negative report.

We have tried penicillin for gonorrhœal conjunctivitis in babies. They cleared up in two or three days. When the baby starts to breathe they put silver nitrate 1%, into the eyes, but I do not think it always gets there. I feel, however, we should do some research work and see if penicillin or sulfa drugs would not be more advantageous in the treatment of children.

In one case of blepharitis we used a penicillin ointment with eucerin base. We gave the ointment to the patient to take home with her, and the blepharitis cleared up on the second day. But on the fourth day the blepharitis returned. The patient did not keep the penicillin ointment in the ice box and it went bad.

A patient with a perforating eye wound, in which the culture showed *Staph. albus,* was treated with penicillin with no result whatsoever. Everything was tried but nothing was of any help. I then tried tyrothricin. It cured the case, and it has remained cured. Tyrothricin also cures blepharitis. It also has to be kept cool.

Dr. Stuart Ramsey, Montreal:

I think we all agree that penicillin is still in the empirical state.

In regard to corneal ulcers: We have treated 13 very severe corneal ulcers; 3 were Mooren's ulcers, and 10 hypopyon ulcers. In the Mooren's ulcers two responded rather unusually well, one was very much better the next day and completely healed in three days, the other one was all healed up in a week. The third was unchanged. None of the hypopyon ulcers perforated, and all were very severe. Some healed in a rather remarkably short time, others did not.

I think many other people have noticed that you get a quick result from penicillin frequently in the first few days, then after that the effect slows down. In one particular case, we not only had a slowing-down, but as soon as the patient left the hospital he had a recurrence of his hypopyon ulcer. Finally, by injecting penicillin into the anterior chamber the case cleared up.

We should appreciate that in spite of the unusual results we have had, with penicillin still in the empirical stage, we should appoint people to work on specific problems and to work out methods of treatment.

Dr. A. D. Ruedemann, Cleveland, Ohio:

My experience with penicillin has been one that you get in the general clinic with all types of cases. Commander Schubel has made a contact cups with small pinholes in the cup and this is held in contact with the ulcer for 20 minutes. Since using the cup we have had definitely better results.

We had a case in the hospital who had had an implant and he developed a very severe orbital cellulitis. We started him on 20,000 units of penicillin every three hours. The infection subsided then was destroyed in one week. I wonder if so large a dose is necessary to get a result? I think it is very remarkable that, in our experience, in fixed infections it does not seem to do so well as in some of the acute cases. We had fifty other cases who had had implants and none had infection.

I want to compliment Wing Commander Nicholls on his very fine talk on penicillin.

Dr. B. Alexander, Montreal:

I have two groups of cases: One was a little girl, 5½ years old, rather undernourished, who was admitted to the Children's Memorial Hospital. Her right eyelid was swollen and she had a temperature of 103°. There was exudate coming from between the lids and it was impossible to see the cornea. The culture showed *Staph. pyogenes.* She was put on penicillin, 800 units per c.c. topically, every three hours. Within 24 hours the temperature dropped to normal. On opening the lids there was a false membrane covering the eye. Penicillin was used for five days; the cornea was clear and the eye looked perfectly quiet and the edges of the lids cleared up nicely. I feel that without penicillin the eye would have been lost. We prefer a smaller concentration to the cornea.

Since May, 1945, I have had a group of six cases of dacryocystitis. Three were chronic, giving a history of 1 to 15 years, and had been treated surgically and otherwise. In these three cases I could get fluid through to the nose, using penicillin in the lachrymal syringe, and there has been no recurrence.

Three cases were admitted to hospital with acute dacryocystitis. We used penicillin locally. After a week the acute infection subsided and we were able to syringe the sacs with fluid passing into the nose. Clear mucus could be expressed and there was very little epiphora. The emulsified form of penicillin was injected direct into the lachrymal sac. This amount necessarily was very small. The organism found was pneumococcus.

Dr. Jules Brault, Montreal:

We have had good results and bad results. In a case with after cataract infection I gave penicillin, 100,000 units, and the infection cleared very rapidly.

I also had a case of acute choroiditis, a young man about 20 years of age, with a throat infection and angina. I gave him penicillin, and in 24 hours he was cured. I have also had a case of conjunctivitis and blepharitis which got well under penicillin treatment. My most interesting case was the acute choroiditis.

Dr. M. R. Levey, Edmonton:

We thought of trying eye discs and used a gelatine base, but we found that the discs were disintegrated very quickly. We substituted a

little agar. The discs remain in the conjunctival sac quite a long time and the results have been better than using ointment. We always use eucerin base because we find other bases irritate. We were able to make comparisons in every case, using the ointment and the disc, and as far as we have gone in a very limited number of cases we think the discs with the agar have been the most satisfactory; 125 units of penicillin to each disc, each disc measuring 6½ mm. No local anæsthetic is used; the discs do not irritate.

Dr. Henri Pichette, Quebec:

We have had in our clinic many cases of keratitis and conjunctivitis which we have treated with penicillin.

I had an interesting case of cataract 3 years ago, a woman, who after operation was very well and had 10/10 vision. She stayed well for 3 years; but in the winter of 1944, she came to the hospital with an infection in the eye operated upon. The day before admission to the hospital, she had a little pain with loss of vision in the eye. The loss of vision was very sudden, as the infection seemed to start in the night and by morning the vision was gone. On admission no local infection was seen. She received 100,000 units of penicillin for 10 days without any result. She had a systemic infection from some unknown cause. A week ago she came to me for an operation on her other eye. As yet I do not know what the result will be.

Dr. Fred Smith, Department of Bacteriology, Royal Victoria Hospital, Montreal:

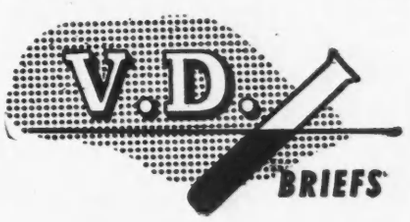
I do not know much about penicillin in ophthalmology, and will content myself with mentioning some of the problems of penicillin therapy. Perhaps you can explore the rest by asking questions. As far as I can see, some of the conditions in ophthalmology do not have a clearly infective basis. For that reason the use of penicillin is on a distinctly experimental basis. In endeavouring to find out if penicillin will influence cases, it seems much wiser to take a smaller number of cases and give them larger amounts, than to spread the penicillin more thinly over a large number of cases.

I think of late the pertinent trends coming out about penicillin have been in recognizing some of its limits and how most efficiently to administer it. The limitations are based on the fact, of course, that it is of value only against certain species of bacteria. The list of susceptible microbes has been added to as greater concentrations of the drug were brought to bear. In the early days when material was on short supply they were trying to conserve penicillin a little too much and for that reason the therapeutic response in some cases was missed entirely. This is so, for example, with subacute endocarditis and actinomycosis. Still, however, the susceptibility to penicillin varies very much from one bacterium to another. I think everything goes to show that with some microbes it might take as long as three to four months before an infected tissue containing bacteria can be considered sterile. Others may require only 24 hours. This matter of expecting to receive results in a day or two is definitely out. Blepharitis may require topical application for three months. In abscesses and medium cavities, where you have excellent opportunities to bring it to bear on the spot, it takes at least twelve days to two weeks of sterilization. I am trying to get away from the impression that two or three days' treatment is always satisfactory.

Penicillin disappears from the blood in three or four hours after injection. It does not get into certain places in the body, such as pleural and synovial spaces, abscess cavities, and spinal fluid. Into these it must be deliberately injected. Intramuscular injection every three hours is a tedious affair, and many efforts are being directed to get round it. Some of these depend on the slowing up of absorption by suspending the penicillin in oils and injecting intramuscularly. In oral administration you will have to take into account the fact that the penicillin is destroyed by gastric juices. This may be overcome by adding a buffer. Lower down there may be penicillin-destroying bacteria in the gut. There is much variability from patient to patient in the possibility of absorbing penicillin from the intestine. Oral administration is still definitely an experimental business. Topical application in the form of solution or emulsion is often effective for superficial infection. Ionization has been found valuable in making penicillin available to tissue when diffusibility alone is inadequate.

1414 Drummond St.

Venereal Disease Campaign



Congenital Syphilis

The diagnosis of congenital syphilis should be applied only to cases showing definite evidence of the existence, or former existence, of the characteristic changes of congenital syphilis. The congenital origin of syphilis is not to be assumed merely because the time and circumstances of the infection cannot be ascertained and there is no scar of a primary lesion.

Multiple Contacts

The clinical history of the patient should be kept in mind by the physician in his enquiry for alleged contacts to a venereal infection. A patient may have had several contacts within the incubation period of his infection, any one or all of whom may have been, or have become infected at the time of the sexual exposure. It is important that all such contacts are examined to ensure that none remain an undetected health menace.

As a guide in this matter, the incubation period of gonorrhœa is stated to average 3 to 9 days, but may, in certain instances, be as short as 2 days or as long as 14 days. The incubation period of syphilis is commonly 3 to 4 weeks, but may be as long as 3 months.

Regularity of Syphilis Treatment

It cannot be too strongly emphasized that regularity of syphilis treatment without long or short-time variations or lapses is critically important to both infection control and cure.

"Find V.D. Contacts — Report V.D. Cases"

Clinical and Laboratory Notes

INHALATION ANÆSTHESIA FOR TONSILLECTOMY

By T. R. Nichols, M.B.

Stratford, Ont.

My present purpose is to suggest that intratracheal anæsthesia is of the same degree of helpfulness as the mechanical suction and vaporizer.

The main difficulty in anæsthesia for tonsillectomy arises from the necessity for the anæsthetic agent to pass through the field of operation. For this reason, the manipulations of the surgeon interfere with those of the anæsthetist, and a reasonable compromise must be reached. The nature of the operation makes hæmorrhage unavoidable, and the prevention of aspiration of this blood is a necessity.

The anæsthesia is required to be of considerable depth in order to prevent throat reflexes. In addition to anæsthetic, sufficient oxygen must also be passed through the field of operation.

Owing to the number of instruments required to be in use at one time, it is necessary for the anæsthetist to function also as a surgical assistant. Because the operation is considered a minor one, it is a common occurrence for patients to arrive on the operating table with food in the stomach, or without satisfactory preoperative sedation.

METHOD

1. A sincere attempt is made to have the patient arrive on the operating table with an empty stomach, and under the influence of a suitable sedative.
2. Anæsthesia is induced with ethyl chloride and ether.
3. As soon as the jaws relax, a Magill tube is introduced into the larynx through the mouth by means of a laryngoscope.
4. The beveled end of the tube is lubricated for a distance of one inch with nupercaine ointment.
5. The mouth gag is immediately dropped over the oral end of the tube.
6. By means of rubber tubing, the Magill tube is connected with the ether can.
7. The ether can is an ordinary one-pound can, with the tube attached to the central opening and with several other openings punched into the top of the can.
8. The patient is ready as soon as the ether can is attached to the Magill tube.
9. Further attention is necessary only to maintain a small amount of ether in the can, and to vary the concentration of ether vapour by covering or opening the holes in the top of the can, according to the requirements of the patient.
10. Apart from this, the anæsthetist is free to render assistance to the surgeon.

ADVANTAGES

1. *Smooth anæsthesia.*—As long as ether remains in the can, the concentration of vapour will vary only slightly except by the opening or closing of the holes in the top of the can. My experience has been that with only one hole open, all adults are maintained indefinitely at a satisfactory depth. With children, I frequently find it necessary to reduce ether concentration by opening more holes. To a large extent, the depth of anæsthesia is maintained automatically; as the patient enters a lighter stage of anæsthesia, he breathes more deeply and automatically resumes a deeper stage of anæsthesia.

2. *Aeration.*—Adequate oxygenation is constantly present. I have never seen cyanosis after anæsthesia through the tube had been established.

3. *Hæmostasis.*—Hæmorrhage causes much less anxiety. The whole mouth may fill up with blood, but anæsthesia and oxygenation is perfectly maintained without any difficulty. The surgeon is under no necessity to hurry, but may take the necessary time to aspirate the blood, find and clamp the bleeding vessels, and to tie them if necessary. Much more complete hæmostasis is possible because the blood simply

pools in the back of the throat instead of being distributed by air entering and leaving the larynx.

4. Visibility is so much increased by the quiet pooling of the blood and by the better hæmostasis, that it is much easier to see the tonsil fossæ, and to remove any tags of lingual tonsil. Better surgery thus results.

5. Because the Magill tube fits the larynx rather snugly, foreign material cannot be aspirated into the trachea. A very potent source of lung abscesses and respiratory complications is thus removed.

6. The anæsthetist has both hands free with which to assist the surgeon.

7. Time saving. The operating time is reduced in three ways. (*a*) Although the introduction of the Magill tube is an added technical manœuvre, it can—with practice—be quickly accomplished. It is my experience that with the tube once in place, I am immediately ready for the surgery, though without the tube I would have considered it advisable to further saturate the patient. (*b*) Naturally, the surgeon is able to work more quickly when he has no interruptions on account of anæsthesia, and in addition has the anæsthetist helping him with both hands. (*c*) On account of the ease of hæmostasis, the surgeon feels free to pack a loose gauze sponge into either of both tonsil fossæ, or into the post-nasal space while he works elsewhere. Frequently this is sufficient to arrest minor hæmorrhage without further effort on his part.

8. The surgeon is not annoyed by having irritating ether vapour projected into his face by the patient's respiration.

9. The ether vaporizing by evaporation in the can, and being inhaled and exhaled through a considerable length of tubing, is thereby warmed and made much less irritating than ether vaporized by bubbling air through it.

CONCLUSION

These several advantages have seemed to us to be of sufficient importance to lead us to adopt the above method in all cases in which we are able to insert a Magill tube. We have used cyclopropane in this manner, but the bulkiness of the equipment and the attention to the machine by the anæsthetist have been very real disadvantages, where the anæsthetist must also function as surgical assistant. The surgeon usually needs to have demonstrated to him that by placing his tongue retractor over the Magill tube, and retracting both tube and tongue together to the opposite side of the throat, he can obtain better vision, and the tube is not a hindrance to him. The can of ether must also be moved from one side of the patient to the other, away from the side on which the surgeon is working. The tube needs to be fairly firm so that it will not kink easily. And finally, it is necessary to instruct nurses watching these patients during postoperative recovery, that they must not remove the tube until pharyngeal reflexes have returned, or better still, the patient should be left to remove the tube himself. Strangulation may easily occur in these patients if the tube is removed too soon. The enthusiastic reception of this procedure by our surgeons leads us to recommend it as a routine method of inhalational anæsthesia for tonsillectomy.

196 Ontario St.

Editorial

MALARIA IN THE UPPER MISSISSIPPI VALLEY

NO single disease has been a greater scourge to mankind than malaria. And the history of the present war both in the Western and Eastern hemispheres shows that it still occupies this leading rôle. How far modern methods are likely to succeed in diminishing it has yet to be seen; there is certainly some hope in that direction. At the moment, however, it is interesting to look back at a period in North American history during which malaria was a very real threat to the development of a large area in the United States. The story is well told by Dr. Erwin H. Ackerknecht in the *Bulletin of the History of Medicine* (Supplement No. 4, 1945).

The area referred to is the Upper Mississippi Valley, or to be more definite, the States of Minnesota, Wisconsin, Iowa, Illinois and Missouri, and the period covered is between 1760 and 1900. Perhaps the main stimulus to the investigation lies in the fact that the disappearance of malaria from this area was in no sense due to direct anti-malarial measures, a fact which may be paralleled to a certain extent by the rapid decline in tuberculosis mortality in North America previous to the anti-tuberculosis campaign.

The first step of course was to establish the fact that malaria did exist in this region, and in serious proportions. It at once becomes apparent that there are great gaps in the records. That the country was malarious is not disputed, but to what extent? The evidence is found not so much in medical records as such, as in non-official accounts. Even regular historians of the time are apt to pass over it, not because there was no malaria, but because there was so much of it.

"The ague"; "the shakes"; "chills"; were accepted as part of the surroundings, and received no special comment. What clinical records exist suffer enormously in value because malaria was so often confused with typhoid fever, and *vice versa*. This diagnostic muddle lasted till well past the middle of the 19th century, and in some districts signs of it are found till well into the twentieth century. Austin Flint in 1847 did his best to point out the distinctive characters of remittent, typhoid, and typhus fever, but until the plasmodium was discovered even autopsy findings were apt to be imperfectly understood.

However, with all due allowance for lack of accurate description there can be little doubt of the widespread prevalence of malaria in the Upper Mississippi Valley from its earliest days of settlement until the middle of the 19th century. Drake's famous study on the diseases of *The Interior Valley of North America* concludes that, "It is the *great* cause of mortality or infirmity of constitution, especially in the Southern portions of the Valley and therefore entitled to severe and patient attention".

With the opening up of this large area there was a corresponding boom in malaria and the disease was reflected in the habits of life of the people; as one author puts it: "The minister made his appointments to preach so as to accommodate his shakes; and the Justice of the Peace entered the suit on his docket to avoid the sick day of the party or his own."

How is it then that malaria has so completely disappeared from this region? Analysis of the responsible factors is not easy, but some undoubtedly are of major importance. There is for instance a very close relationship in time between the decline of malaria and the period of railroad expansion. This brought about the shifting of settlements from along the watercourses to inland areas, and their consequent removal from malarious areas. Next, there was the drainage of land for cultivation. It may not be generally realized, however, that drainage in itself does not lead to suppression of malaria. This was well recognized in Italy. What is important is that cultivation with drainage leads to better living conditions and improvement of housing. It is in these latter results that cultivation has its effects in the decline of malaria.

Other important factors are; the increase in dairy cattle, which it is known serve definitely to draw off mosquitoes from feeding on human beings; increase in wealth generally and improvement of living conditions; and the introduction of quinine. This last forms an extremely interesting chapter in the history of malaria, but its direct effect on the decline of malaria cannot be stated as definitely as might be expected. Therapeutically, of course, its value is unquestioned, but by itself it has never yet caused the eradication of malaria from any country. It does, however, control the course of the disease enough to allow man to work for a time at any rate: as Dr. Ackerknecht says: "Quinine broke the vicious circle of disease-producing inactivity". It is a "direct anti-malarial" but its ultimate effect is of the most indirect nature.

Lastly, it should be realized that whatever factors may have been responsible for the disappearance of malaria in the Upper Mississippi Valley, there still remains intact one most important link in the chain of circumstances which lead to the presence of malaria; this is the continued existence in the area mentioned of large numbers of *Anopheles quadrimaculatus*, the main vector of malaria. It is possible that there may have been some change in the species which has contributed to the decrease in malaria, although this seems unlikely; or there may not be now a reservoir of malarial disease in the population to maintain the infectivity of the insects. But this is no assurance that the mosquitoes in the Valley would not again play their part in spreading the disease whenever the other requisite conditions were present.

As a final reflection, the history of malaria in this region is regarded as reversing the teaching that countries have declined because they became malarious; the Greek, Roman and Ceylonese cultures are given as instances. It is felt rather that they became malarial because their culture declined. Malaria may stop progress, but, given the capacity to take advantage of the natural wealth of a country, even a highly malarious region may finally be tamed and brought to a high state of civilization.

Editorial Comments

Specialism

One frequently hears deprecation of specialism. It is a subject which provides ready material for epigrammatic or humorous comments. A recent editorial,* for instance, speaks of specialists creating many things which might serve humanity, but which end up by doing more harm than good; and it quotes the apophthegm that specialism is another form of ignorance. The remedy suggested is a good general education to begin with, specialization to develop later along its given line. But it is not quite so easy to arrange this. For one thing, the "good general education" is fast becoming an attainment so many-sided in nature as to be open to keen discussion. For another, it seems to us that the fundamental requirement is not whether a man will try to know about many things or about one only, but whether he has commonsense and mental balance. With these he will realize the ignorance from which all men must suffer in relation to universal knowledge, whether they specialize or not, but he should also be able to grasp some common factors in the sum of knowledge. This is peculiarly true in medicine. The specialist is here to stay, beyond all question. The general practitioner as of fifty years ago has gone beyond recall. But the principles of dealing with human beings are still within reach equally of both types of practice. There will still be every need for the highly trained surgeon or internist just as there always will be for the man who sees and treats many ailments, both surgical and medical. But both these types may be equally qualified to deal to some extent, for example, with what we call psychosomatic disease. The qualification to do this may be strengthened by special training, but a sympathetic and understanding mind is needed first. The war has served to quicken our realization of psychosomatic conditions, but it would be a pity if these came to be relegated wholly to a specialized field. Many of them no doubt come within the range of psychiatry, but even the trained psychiatrist might fail in a given psychosomatic problem in which a specialist in quite another field might succeed. The difference would lie in the degree of wisdom, not of knowledge.

Specialism only narrows where there is narrowness; the cure lies in "the waking eye, the prying mind".

Resignation of Mrs. L. Lang

We report with the greatest regret the resignation from our Editorial Staff of Mrs. L. Lang, Assistant Managing Editor, taking effect on September 1.

Mrs. Lang has been connected with our Association for the unusually long period of 34 years, her service dating from the earliest days of the establishment of the *Journal*. In that time she has been associated chiefly with the financial side of the Association acting for the greater part of the time as Treasurer. With the growth of our organization her work became more and more important. She acted as Secretary to the Editorial Board and assumed a large share of the detail of the Editorial office, exhibiting at all times the highest degree of efficiency as well as a personal interest in the work of the *Journal*. She has made notable contributions not only to the development of the *Journal* but to the Association as a whole.

We all join in wishing her happiness in her new sphere of activity.

* *Health*, August, 1945.

Medical Economics

THE RÔLE OF GOVERNMENT IN THE PROVISION OF HEALTH SERVICES*

By F. W. Jackson, M.D., D.P.H.

Deputy Minister of Health and Public Welfare, Province of Manitoba

Winnipeg

The most important asset of any country is its people, and the good health of each person in a state is the only sound foundation upon which a prosperous and happy nation can be built. Therefore government must be primarily concerned with the health of its people in order that the state may flourish. The health of its citizens has been the concern of government since at least as far back as 1665—the time of the Great Plague. In the year 1838, Sir Edwin Chadwick and a group of physicians in England were engaged to study systematically those environmental conditions which might contribute to ill health. Following the investigations the report entitled "The Sanitary Condition of the Labouring Population of Great Britain" was submitted to the Government. It created a profound impression both in England and abroad, and initiated a world-wide movement for satisfactory water supplies and safe sewage disposal. It also laid a firm foundation for future progress in administrative health practice through the control of communicable

* Read at the Seventy-sixth Annual Meeting of the Canadian Medical Association, Montreal, P.Q., June, 1945.

disease, prevention of illness, and the promotion of health.

Why did government have to enter the field of preventive medical practice? It entered it because doctors could not and did not seek out ill health, but waited until sick people requested the physician's services. We realize of course that the private physician could not do otherwise because his motives would have been misunderstood by the public. Governments, the world over, have assumed responsibility for the control and treatment of tuberculosis, mental disease, and venereal disease, because medicine could not go out and find these diseases. There is no one amongst us but must admit that the prevention and treatment of these conditions are better now than they were previously under private medical practice. Demands for Government intervention are increasing in respect to the control and treatment of cancer, arthritis, and crippling conditions of children. However, until the last three or four years government in Canada has shown no great desire to enter further into the realm of so-called "curative" medicine. When the results of the examination of our young people volunteering for enlistment in His Majesty's Forces showed that very little more than one-half of them could obtain a clean bill of health it naturally aroused government as well as public concern. This has been evidenced by the consideration of health insurance by the Federal Government at Ottawa. All of you who have listened to the election promises made during the recent election campaign know that every political party has promised the people of Canada "better medical facilities" in one form or another. Several of the Provincial governments, particularly in Western Canada, have canvassed ways and means by which better health services might be provided for their people. The demands of war have practically eliminated medical care from great areas of the rural parts of the Prairie Provinces. In fact the situation in Manitoba is so bad that we have in the neighbourhood of fifteen communities receiving emergency medical care through the services of registered nurses under the control and supervision of the Department of Health and Public Welfare.

Following consideration of all these circumstances the Manitoba Government felt they could not wait for Federal health insurance to become effective and decided steps should be taken immediately to try and ***help our people to help themselves to provide better health services.*** This decision to help people help themselves culminated in the introduction and passing at the last session of the Manitoba Legislature, of "An Act to Provide for the Improvement of the Health of the Citizens of the Province". The approval of this act made possible the Manitoba health plan. To illustrate what we think the rôle of Government should be in the provision of health services I will outline briefly the Manitoba health plan.

In the preparation of this plan four objectives have been kept in mind—*i.e.*: (1) the most urgent needs of our people. (2) The provision of the services in such a manner that the required technical personnel will have working conditions conducive to a high quality of service. (3) That the services provided should have a reasonable chance of being maintained despite any change in the economy of our Province. (4) That the services should be so planned that they will readily fit into any plan which may be inaugurated at the federal level of government. On this basis it was decided to make provincial funds available to our people to assist them to obtain four types of service. These are: (1) full-time health services; (2) reasonable diagnostic facilities; (3) general practitioner services; (4) more adequate hospitalization for our rural areas. From the foregoing it will be noted that the plan is essentially a rural one, and has as its foundation the prevention of disease.

1. Local Health Services

Local health services are exactly what the name implies: provision in rural areas of a similar type of specialist preventive service as is now usually only available in urban centres. It is expected we will require approximately twenty to twenty-five full-time health units to completely cover the Province. These will be staffed by the necessary specially trained medical, nursing, and sanitary personnel, in order that we may provide a worthwhile service, particularly in the children's field; and co-ordinate such things as tuberculosis control, venereal disease control, and mental health at the local level. It has been suggested that this service will do the local medical practitioner out of the fees he now obtains for part-time health

officer's duties and therefore reduce his income. This is not borne out in practice. When we have some organization actually going out into a community and searching for disease and defect the physician who is primarily concerned in the practice of "curative" medicine cannot help but benefit.

2. Reasonable Diagnostic Facilities

When any local area has established full-time health services it may make application for the provision of a reasonable diagnostic service for all its people on a pre-payment plan; such service to be given at the local general hospital and only on the request of a physician. These services will be supervised and directed by trained radiologists and bacteriologist-pathologists operating from the central hospital in each area. This diagnostic service will cover the usual examinations and tests provided by a radiological department and a laboratory service, such as are ordinarily required by an up-to-date physician for the proper diagnosis and treatment of disease.

The two above mentioned services, *i.e.*, local health services, and diagnostic facilities, will be provided by personnel who will be employees of the State; and the operational cost will be divided two-thirds to the Province and one-third to the local area. The Government will make available all the capital funds necessary for the equipment of the health units and the provision of the x-ray plants and laboratory facilities in the general hospitals.

In respect to the x-ray services there will be a small service charge for x-ray plates, *i.e.*, one dollar for the first plate and twenty-five cents for each subsequent plate; the total in any one illness not to exceed five dollars. We hope such an arrangement will impress on people that this service is expensive and the privilege of having it should not be abused.

3. General Practitioner Services

When a community has provided for full-time health services and diagnostic facilities they may then consider the provision of a general practitioner service on a pre-payment basis; and if they make satisfactory arrangements with a doctor or the profession for the provision of such services they will be entitled to request and receive from the provincial government a sum not exceeding fifty cents per head of population per year. The method of pre-payment is left entirely with the profession and the community desiring such service; and may be by salaried physician; capitation; or fee-for-service-rendered basis. We believe that the general practitioner's services, which may be provided under any pre-payment plan, should be definitely defined to limit the practice to medical care that can be provided satisfactorily in the patient's home, the doctor's office and the local hospital. This would include minor surgery, uncomplicated obstetrics, and simple fractures; but would not include major surgery. The general practitioner's most important responsibility should be the supervision and care of every child in his area from the time of conception until school age.

4. More Adequate Hospitalization for our Rural Areas

Hospitalization in Manitoba, particularly in our rural areas, has been for many years unsatisfactory. A commission of enquiry into this subject, after a three-year study, made certain recommendations for improvement in the situation. The most important of these was the establishment of a Hospital Council, whose duty it would be to draw up an appropriate plan of hospitalization for all of Manitoba. This has been done. The Hospital Council recommends that the Province be divided into four hospital areas. Each hospital area will provide three kinds of hospitalization, *i.e.*: (1) A central hospital where all types of diagnostic and medical care services would be available; (2) rural general hospitals situated at various centres in the area that would provide the services generally required for the diagnosis and treatment of all ordinary sickness, including most major surgery; (3) a medical-nursing unit, or "doctor's workshop" at all other points where a medical man is located. This would be a building housing the doctor's office and examining room; a labour room; nursery; and from six to twelve beds primarily for maternity cases and medical cases requiring hospitalization. When the plan, which has been approved, is fully brought into operation it should do three things: (1) Make hospitalization for most illnesses readily available to all our people in their own community; (2) make it possible for medical men to practise their profession in the way they have been taught to do; (3) make medical practice in rural areas more attractive by having hospital service and diagnostic facilities readily available to every medical man.

Before the Government's health proposals were made public the Honourable Mr. Ivan Schultz, Minister of Health and Public Welfare, as an act of courtesy, discussed them with the executive of the Manitoba Division of the Canadian Medical Association. As soon as the legislation was drafted it was made available to the legislative committee and discussed in detail with both them and the executive of the Association. Any changes recommended which did not conflict with government policy were made; even the most minor alterations in the draft legislation were cleared with the Association's legal adviser before the Bill was formally presented. Special meetings of all the district medical societies were held so that the Minister or other members of the Department could explain the plan to the rural physicians and get their comments before the legislation was finally drafted.

The Minister was insistent that this procedure be followed in order that the profession might be fully aware of what was being presented to the Manitoba Legislature. The position taken by him and the Government of Manitoba is that no health plan can succeed without the co-operation of the medical profession and such co-operation must be on a mutual understanding of the health needs of the public; these are the responsibility of the Government. The preservation of the *just rights* of the profession in providing service are the responsibility of organized medicine. The legislation passed through the legislature without any opposition and the Government appropriated the funds to inaugurate nine health units and nine diagnostic centres this year.

The Manitoba health plan makes no attempt at regimentation of either the public or the medical profession. Each community must decide for itself whether or not it will take advantage of what the Province has to offer; and, as I have already mentioned, when it comes to the provision of a general practitioner service on a pre-payment basis this will be a matter entirely for decision between the profession and the local community. This is a compulsory plan in that when any community enters into an arrangement for the provision of any or all of the services they must be available to every resident of that community, regardless of the individual's ability to pay.

One might ask, how much control is the Government going to exercise over the Manitoba health plan? When one reads the legislation pertaining thereto it will be quickly noted that the final control of the operation of each part of the plan rests with an advisory commission, in that no regulations or rules can be promulgated by the Government without the approval of the commission. We believe this body fairly represents the various groups of the public concerned. It is composed of the following: (1) Three members of the Commission are nominated by the Manitoba Division of the Canadian Medical Association. (All must be members in good standing of the Association.) (2) One member is nominated by the University of Manitoba from the Faculty of Medicine. (3) Three members are nominated by the Union of Manitoba Municipalities. (These will represent the viewpoint of local government.) (4) Three members are appointed by the Government. (These will represent other groups in the community not taken care of by the nominations outlined above.) (5) The Deputy Minister of Health and Public Welfare. (He is an ex-officio member of the Commission.) This means that of the eleven members of the Commission at least five will be members of the medical profession.

In order to assist municipalities to finance the plan new taxing powers have been provided in the form of a personal health levy. This will be a direct payment in cash by all individuals in the community. If this assessment is not paid by the time specified, it may be enforced by inclusion in the land taxes of the individual; or be a first charge against his wages; or it may be collected through the small debts court.

Another important section of the Act is one dealing with grants. Wide powers have been given by the legislation to the Minister of Health and Public Welfare in respect to "grants" for the following purposes: (1) improving the facilities for teaching in the Faculty of Medicine of the University of Manitoba; (2) encouraging research in matters relating to health; (3) bursaries or scholarships to undergraduate students engaged in the study of medicine; (4) bursaries or scholarships to assist graduate medical practitioners who are engaged in postgraduate studies in order to fit themselves to become specialists in

any branch of medical science; (5) training the personnel needed for carrying out the provisions of this Act, and in particular, and without restricting the generality of the foregoing, for training technicians, public health nurses, and sanitary inspectors.

These grants are also under the control of the advisory commission in that the method of their provision is to be set up by regulations and these regulations will have no force or effect unless they are approved by the commission.

What does this Plan mean to the people of our Province in the way of cost? If every family in a municipality entitled to family allowance would contribute one month's cheque each year, and all other persons four dollars per year, there would be enough money provided to pay the municipal share of the yearly cost of full-time health services, diagnostic facilities, general practitioner services, and pay for any deficit which might be incurred in the operation of the local medical-nursing unit, or doctor's workshop, and the district hospital. In other words such contributions would pay for the operation of the complete plan. This would mean that the local physician would have adequate and sufficient facilities with which to practise as he should; and would increase his net income by at least $1,000.00 more than he received in the banner year of 1929. We believe it is only right that we should try to improve the lot of that often forgotten member of the medical profession, the rural general practitioner.

The plan has been well received by the public of our Province. The Manitoba Pool Elevators, one of the most influential farm organizations in Manitoba, has voluntarily taken over the responsibility of educating our rural people to the idea that every rural physician must have a suitable "workshop" from which to practise. Their educational literature states in bold type "if a community wants a doctor to serve them he should be provided with a modern workshop". Already, applications from many communities for permission to organize for and build these medical-nursing units, or doctor's workshops, have been received. The lack of personnel is the only thing that will prevent us from going forward as planned.

In conclusion, I would like to say that, to my mind, there has been a lot of loose talk about Canadian medicine being at the cross-roads. Medicine is not at the cross-roads. It is on a highway leading to that goal desired by everyone of us; that is, that everything medical science has to offer for the improvement of health, prevention of disease, and the cure of illness, should be available to every Canadian citizen no matter where he lives or what his financial status is. For the well-being of the nation, the public, the government, and the medical profession must co-operate so that medicine may go onward to its goal. It is axiomatic that if a state is to be in a condition to properly safeguard itself, its people must be as physically and mentally fit as it is possible to make them. On this assumption it is therefore imperative that the government should take a leading rôle in trying to direct the health activities provided by the various organizations in the State so that the maximum in health might be obtained by all its citizens.

The place of government therefore in the provision of health services should be to provide leadership; direction; and where needed, financial support.

RÉSUMÉ

La santé publique doit être le plus important ministère de tout gouvernement. Son action s'exercera avant tout dans le domaine préventif; à cet effet, le plan sanitaire du Manitoba est très compréhensif; ce plan, qui s'adresse surtout aux districts ruraux,—moins favorisés,—assure un service sanitaire ininterrompu, des facilités accrues de diagnostic, les services du praticien et l'hospitalisation pour tous les cas qui nécessitent cette mesure. On sait déjà le bien accompli par les unités sanitaires; ces unités seront pourvues de laboratoires de radiologie et de bactériologie, et elles auront en plus les services d'un praticien expérimenté. Une attention particulière est donnée à l'enfance. Un plan d'hospitalisation a été étudié et est en voie de combler les lacunes de la pratique médicale rurale. Ce plan est accepté par les médecins ruraux. Onze membres forment une Commission administrative du plan; sur les onze membres, cinq sont des médecins. Les dons et octrois seront administrés par la Commission. Le coût d'opération du plan n'est pas excessif et semble accepté de bonne grâce par la population. Le gouvernement, en instituant ce plan a fait preuve à la fois d'autorité et d'altruisme; il va contribuer largement au maintien et à l'amélioration de la santé.

JEAN SAUCIER

THE PLACE OF THE VOLUNTARY PLAN IN HEALTH SERVICES*

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To strip health services of its various emotional and materialistic involvements is to risk the displeasure of Governments, powerful insurance interests, and the equally powerful interests and emotional factors of our own profession. Perhaps, even more difficult and risky is to try either objectively or practically to evaluate the effect of selfishness in human nature on such plans.

For eight years now as managing director of Associated Medical Services, my time has been occupied in running the cross currents of all these elements. It may have been with the thought in mind of saving the reputation of someone less willing to "rush in where angels fear to tread" that the program Committee asked me to undertake the task. Whatever the risk involved, I shall try to lay before you the basic principles which will, in the long run, determine and guide the operation of any health service plan whether it be voluntary and non-profit, voluntary and profit-making, or governmentally controlled. To attempt an evaluation of any part of health services on any other basis would be to fail before starting.

1. What is Health Service?

Unless we get firmly fixed in our minds the objective of health service, its purposes and limitations there is no subject which can create greater confusion in a shorter time. Unless the subject is approached without bias there is no project fraught with greater risk of financial and moral failure.

Insurance generally is the application of the law of averages to the cost of certain risks within very definitely fixed and controllable limitations. In the true sense of its application, it becomes basically necessary that those receiving the benefits shall be responsible for paying the costs or premium. When and if benefits are drawn by someone not sharing directly in the costs, the landmarks become obscured and the whole balance of the law of averages is disrupted. When and if this occurs, it is necessary to recognize that we no longer have a self-sustaining entity and some outside unlimited source of financial support must be found.

It is at this point that emotional and personal motives are most likely to enter our thinking and give rise to elements which are absolutely inimical to progress or success. It is at this point that the approach to the problem of health services so far made in Canada, has gone off its course and ended in a great deal of waste effort and frayed relationships. If the problem of health services in Canada is ever to be solved, everyone must recognize that we must separate it into two parts. (*a*) Those who must have medical care, but who cannot carry any of the cost; and (*b*) those who require as much and as good medical care and who can and want to carry the whole cost.

(*a*) *Those who cannot assume the cost of health services.*—Do I sense some spiritual groans from our social planners, and economic as well as social wails from our profession? If so, be of good cheer, I have only stated what has always been recognized by both the social planners and the medical profession. Indeed, if such problem did not exist there would be no need for social planning and our profession would have neither a social nor an economic problem.

To state a problem is not necessarily to condone it, but rather to challenge its solution. I take it that it is not the purpose of health services to try to eliminate the poor. We, in our profession, have of necessity been somewhat more realistic than social planners. We have attended the rich and poor alike on the basis of human need, but we have also been practical and charged the rich for services which we rendered the poor. Those of us who have failed to do so joined the ranks of the poor, and not a few such physicians have died poorer than some of those served.

In providing medical care for those who cannot afford its cost, and to do it in such a manner that neither the poor nor those in attendance will be pauperized in the process has been the particular problem of the medical profession. It is time, however, to recognize it as an equal responsibility of every member of the community. In some Provinces a very good start has been made along the lines of redistribution of that responsibility, giving the public an opportunity of sharing a responsibility which, if properly handled, can elevate rather than degrade. By such segregation it is possible for each member of society, including the profession, to make his proper contribution. At the same time, it is possible to control with a minimum of irritation that elasticity of conscience which is inevitable when a third party foots the bill.

To assure fairness, justice and success to all, it is essential that this time-honoured responsibility of humanity should be redistributed from the shoulders of the medical profession to the populace as a whole. But to safeguard the interests of all, it must be dealt with separately.

(*b*) *Those who can assume financial responsibility for their medical requirements.*—It is at this point that the profession feels that their independence of action both economically and

*Read at the Seventy-sixth Annual Meeting of the Canadian Medical Association, Montreal, P.Q., June, 1945.

professionally are jeopardized. It is undoubtedly the point at which great care and consideration are necessary. It is the point at which grave injury may be done not only to the profession by the public, but to the public by the profession if either lose sight of the primary problem. Any attempt on the part of either to dominate or utilize the project for selfish motives, will give rise to such confusion as to render attainment very distressing to all, if indeed not impossible.

It is, therefore, necessary to remind ourselves at frequent intervals of the purpose of health services; namely, "the application of the law of averages to the cost of medical care within very definitely fixed and controllable limitations". Under such an arrangement each person receiving benefits must contribute equitably toward the cost of such services as are required. This is no less important for the profession than the public. The common fund can no more afford excessive remuneration than it can allow excessive services to be rendered.

It therefore becomes necessary to establish an administration to insure the fair operation of health services. In order to discharge its responsibilities successfully such administration must be free of extraneous influences. It must occupy a position comparable to that enjoyed by our judges and courts. Apart from appeal to the regular courts, its decisions must be final. It must be supported by such authority that at no time will its decisions be reversed so long as such decisions are based on good faith. If an error in judgment occurs, the administration can and must reverse its decisions.

At this point there may be some raising of the eyebrows and some will undoubtedly suggest that here indeed is the spirit of the dictator becoming manifest. If, however, we keep the primary object of a health service before us it will become apparent how essential it is for us to recognize those facts which are for the ultimate welfare of all concerned. I repeat, to successfully provide a health service it is necessary that we apply the law of averages to the cost of medical care within very definitely fixed and controllable limitations. In order to understand the necessity for such an administration and such "very definitely fixed limitations", it is necessary to analyze and thoroughly understand some of the factors involved in actually providing a health service. In *The Canadian Medical Association Journal*, March, 1945,* some of these factors are analyzed at some length. We have time here only to cite some of these factors and illustrate our point from actual experience.

The fixation of limits in the application of the insurance principle involves two types of control. First, there are the inherent controls related to the risks covered. In law these are referred to as "acts of God". The best understood example is known to all of us as life insurance. The inherent control in life insurance is governed by the fact that irrespective of how low the ebb of human vitality or spirit the first law of nature is the desire to live. Therefore, the incidence of death (on which the cost of life insurance is based) can be very accurately predicted during the continuing course of time. Such catastrophies as wars, famine, floods and epidemics do not materially affect such incidence.

The second problem involved in any insurance risk is the element of human control. As just demonstrated, there are comparatively few who will exercise the privilege of dying. On the other hand, in the provision of a health service the risk insured begins with and involves the provision of services primarily designed to preserve health and prevent death.

It now becomes obvious how different are the problems involved in life insurance as compared with a health service. In the former, everyone shrinks from and works to prevent the risk maturing. In a health service not only the basic needs of preventive and curative medicine are utilized, but as life is threatened through illness every desire of the insured becomes a primary responsibility to be provided without restraint. If a common fund such as that provided by a voluntary plan is paying the cost, the patient, all his relatives, and not infrequently the attending physician spend a considerable amount of time creating ways and means of satisfying wishes far beyond the basic needs of sound or even sane medical practice. Let us illustrate from the files of Associated Medical Services:

Family subscriber No.— became eligible for services with A.M.S. on a certain date. The group consisted of a widow and her son. In the history given at the time of application it was stated that both were in first-class health, and between the two they had seen their doctor only twice in the immediately preceding five years. During the succeeding eighteen months while A.M.S. was paying the bill, accounts were received from their physician for these two subscribers for a total of ninety-four calls, either to the doctor's office or the doctor to the home. When A.M.S. decided that the numerous minor diagnoses given and lack of anything more serious than a common cold were insufficient to warrant carrying the risk further, we received communications from three neighbour subscribers threatening dire results unless A.M.S. resumed responsibility. The family doctor also intimated over the telephone that A.M.S. was shirking responsibility.

Subscriber No.—, a reporter, was sent to Hollywood to interview some stars. While there he developed pneumonia, and was confined to hospital for some eight weeks. In all, A.M.S. received accounts for $4,000.00 made up mainly of doctors' fees. After some legal sparring, all accounts were settled for $600.00.

Some of you, perhaps many, are thinking "but those are extraordinary and exceptional cases". While that is true, it must be remembered that the exceptions run all the way down to the actual basic level of the service necessary. Even under strict control such cases add very

*J. A. Hannah, Some observations on health insurance, *Canad. M. A. J.*, 52: 268, 1945.

materially to costs. If such controls be relaxed or interfered with, decisions become impossible and insolvency is inevitable.

In providing health services a voluntary plan can and must be held both morally and financially responsible for its solvency. On the other hand, a compulsory service (which must be governmentally controlled to be compulsory) is responsible to the Government. In brief, a compulsory and consequently Government controlled service has no such "definitely limited responsibility". The inherent factor in a compulsory plan presupposes that the administration of such plan shall be responsible to the Government for its finances and control. Under such circumstances, the administration would not risk their position for the sake of either moral or financial solvency. Instead of a chain of fixed responsibility, there is established an endless chain of irresponsibility which inevitably leads to increasing costs.

Reasoned and logical conclusions would, therefore, appear to demand that a point of very definite fixation of responsibility should be utilized through the voluntary plan as opposed to the vague and indefinite vicissitudes almost inevitable under a governmentally controlled plan. Therefore, if our experience and reasoning be sound, it would appear that the first problem in approaching health service, *viz.*, the fixation of controllable responsibility can best be accomplished through voluntary plans. Through fixation of such responsibility the vast majority of the problems involved in health services can be solved directly with those who render and those who receive the service.

2. The Interests Involved

The consideration of the various interests involved are confined to three main groups, *viz.*, (*a*) the profession, (*b*) the public, and (*c*) the administration. With this last I shall not deal at present. There is a fourth interest which has at times become apparent. Political parties are always on the lookout for popular vote getters. Since we are, however, concerned primarily with the welfare of the practice of medicine and the benefits we may render our patients, we will do well to see to it that we establish direct responsibility in such a manner as to cause the political opportunists to recognize that responsibility for the health and illness of our population is too risky a project from which to make political capital. We shall, therefore, dismiss this interest by the assumption that the medical profession will assume leadership in securing public co-operation and thus see to it that Government regulation shall be only such minimum as will enable us to exercise proper control over ourselves and the public. In securing this end, the profession must seek to assume responsibility, both moral and financial, rather than shift it to governments. To do otherwise, is to play into the hands of political control.

The order of preference with which these interests are dealt depends to a large extent upon who is doing the considering. It is the responsibility of the profession, however, if we aspire to true leadership, to evaluate the relative merits of each.

(*a*) *The interests of the medical profession.*—If the medical profession is to outbid the politician and retain the confidence of the public, we must of necessity subordinate our economic interests. Discussions to date have left the public with the impression that our economic welfare is our prime concern. Again I repeat, to state a fact is not necessarily to agree with it, but rather to challenge its solution. A careful review of public opinion, as expressed through the press, leaves little doubt that whether or not such is our concept of the problem, it is the battle ground on to which our profession is being forced. Unfortunately, close contact with the problem over eight years forces us to the conclusion that such an approach is by no means foreign to the thinking of a considerable proportion of the profession.

The term "bargaining agent" conjures up the picture of economic strife. Of late, this term has been appearing in private and official correspondence of branches of this Association. It is a term, the use of which should be ruled out in our deliberations. If our profession is to gain and retain our proper place in the future, we shall have to see to it that the practice of medicine remains more important than the financial returns to be had from it. This fact must become so obvious that it will allow no shadow of doubt in the minds of the public. The primary consideration of our profession must continue to be, first, the welfare of practice and secondly, the welfare of those practising. If these standards can be kept to the fore in the minds of both public and profession, economics will care for themselves.

Indeed, close study of the problem leads to the conclusion that only through bettering these elements will it be possible to raise the economic standard of the profession as a whole. Present day methods of practice are so wasteful of time, life and energy that many members of our profession are either exhausted or dead long before they have reached the zenith of their maximum usefulness. In our contacts with some 2,000 doctors in southern Ontario over the past two years, there has been an average of more than one death per month from coronary disease in members of the profession under the age of 52. There have been many others in the younger class group partially incapacitated from the same cause. Surely, there is a problem here to challenge solution among a group of men whose primary object is to save life. Apart from the humanitarian aspect, the wastefulness of life among highly trained personnel has a very definite effect on the cost of medical care.

If to this be added the cost of a long and expensive training, a period of another five

years waiting on practice to build up, as well as the waste of time even after such practice is built up, the cost of medical care comes high. It is little wonder that there is an outcry from a population in which, even under war conditions more than 90% earn less than $2,400.00 per year. When it is further realized that in any one year 82% of the profession's income falls on the shoulders of 42% of the population, this cost assumes a distortion which places the cost of medical care beyond the economic ability of those who are unfortunate enough to fall ill.

During the course of a family's existence, they can normally expect at least one period of severe illness. Many will have several. Thus it transpires that practically every family has an experience which focuses the attention of the whole population on the cost of medical care. Let me reiterate that to state this problem is not to condone it, but rather to challenge its solution. The unfortunate part of the picture is that the profession by and large are not adequately compensated. Most members are unable to retire before their final illness, and many bring on that illness endeavouring to maintain a decent standard of living and not infrequently any standard at all.

Here then would seem to be the second problem to challenge solution for the welfare of medical practice and those rendering the service. It must be solved sooner or later, irrespective of the advent of health services, compulsory or otherwise. It is a problem which can only be satisfactorily solved from within our own ranks.

Official discussions so far published on this continent on the solution of the problem of the cost of medical care indicate sharply divided opinion. The line of cleavage falls very definitely between the medical profession on the one hand and the public and governments on the other. Governments and lay groups advocate control by regulation and fixation of charges for services rendered at a point which they feel is within reach of the average person, irrespective of the cost of the service. On the other hand, the profession has advocated no change in methods of practice and an increase in remuneration for service rendered.

Obviously, such diversity of opposing opinions and principles can lead only to a deadlock. This deadlock will inevitably be broken against the profession. It is inevitable under such circumstances that the will of the majority must prevail, and there are only some ten thousand doctors as opposed to some twelve million population. The interesting and intriguing facts are that both parties can, if they will, use the same solution to avoid such a showdown. Also the essence of the same solution can be utilized by either to circumvent or break the resistance of the other should it arise. Still more intriguing is the fact that the approach is based upon the desire of the profession to enjoy the same security which is the basis of the public demand for some method of budgeting against the cost of medical and hospital care.

There is little doubt that anyone who will offer the profession a net income of from five to twenty-five thousand dollars per year, with reasonably fixed hours of duty, regular holidays with pay, opportunity for postgraduate study, and the prospect of superannuation at age sixty or sixty-five, can and will secure the support and co-operation of from 80 to 85% of the profession. If we, as a profession are wise, we will not only recognize this fact (as most of us already do), but we will take such steps as will assure the continuance of individual initiative and the rights of our profession to be responsible to no one but ourselves. If we fail in recognition of this fact and fail to acquire this support for ourselves, there is little doubt in my mind that it will pass beyond our grasp within the next ten years. If we grasp the opportunity, we can develop the application of the scientific knowledge we have accumulated to a point beyond our fondest hopes.

I am not at all concerned as to how we give ourselves remuneration. It can be fee-for-service, panel practice, or salary, the method is unimportant. What is important is that we shall render ourselves and our patients the service of assuring them good and adequate care at a cost and in such a manner that those patients can pay for it in fairness to both themselves and those rendering the service.

Fifteen years of study lead to the conclusion that what is most feared by our profession is any semblance of control. We fear external control because of the threat of regimentation and its inevitable stifling influences. We fear internal control because we do not trust our own ability to exercise such control. Indeed, we are so individualistic that unless our counterpart in a conversation agrees with us he is regarded as beyond the pale.

Let me quote a statement made by a past President of the Ontario Medical Association to the then President of the Toronto Academy of Medicine, both of whom are general practitioners. The statement was made privately during a discussion on health insurance. "You fellows in Toronto do not know what general practice is. You have no concept of the problems involved in general practice". This is indicative of an attitude all too common among us. It is the basis of our failure to comprehend the problem in its entirety. It is indicative of the circumscribed point of view which confounds our confusion, and unless we can rise above it, we will be left at the mercy of extraneous controls which will probably be more interested in politics than the welfare and health of either the profession or the public.

These various interests so far discussed are only a few of those which deserve as much time. Sufficient has been said to indicate the complexity of the problem, and to enable us to

consider how best those interests may be protected. Having been a civil servant for more than seven years before assuming responsibility for the development of Associated Medical Services, I can assure you that there is nothing in that experience which indicates that governments can or will recognize its responsibility to advance the interests of good medical research, practice, or remuneration to the profession. There was a good deal in that experience to indicate that unless any advance either in research or care of the public can be shown to advance immediate political interests, it is exceedingly difficult to have it recognized or carried forward.

For the past eight years, I have been dealing with a voluntary non-governmental project. Although it is almost equally difficult to secure sufficient force to overcome the individualistic inertia of our profession, progress can be carried forward at a sufficient rate to insure both moral and economic solvency. In the interpretation of the word solvency is included fair and adequate remuneration to those rendering service. There is also adequate safeguard to prevent political interests from disrupting just consideration of any and all problems which may arise.

Therefore, in the light of our experience, we maintain that the problems connected with health service plans can best and most rapidly be solved through assumption by the profession of its own responsibilities through a voluntary plan rather than duress through complusion. It is not to be expected that compulsion will be applied to the public and not to ourselves.

(*b*) *The interests of the public.*—What has been so far said in respect of administration and the interests of the profession can be applied equally to the interests of the public. In fact, the various interests are so closely allied that the discussion of any one of them of necessity implicates all others. The problem of the number of people reached by voluntary plans is usually a matter of contempt by the advocates of compulsory plans. In Ontario there are some seventy thousand souls being serviced under the three well-known voluntary non-profit organizations in existence, *viz.*, the Timmins plan, Windsor and Associated Medical Services. It must be remembered that all three have been experiments concerned mainly with the development of the mechanics of the problem up to the present. Any concentrated effort to obtain large numbers on their present basis would probably result in disaster for any of them. Certainly such is the case with A.M.S.

Having now learned a great deal about those mechanics, it is now possible to direct our attention to the problem of expansion. Slipping back for a moment into the rôle of managing director of Associated Medical Services, I hereby invite, and if you wish, challenge this Association and Governments to make use of the experience gained in the eight years of our operation to assist in the application of a proved and successful method of providing health services on a voluntary basis to the population of Canada. Do not expect that if this invitation or challenge is accepted that we shall have our total population of twelve million people on full or even partial services within a year. In previous publications we have suggested that it will take upwards of twenty years to develop health services in Canada whether those services be compulsory or voluntary. Scientific progress is a slow, laborious process. The economics of the application of that scientific knowledge to the public will be even more laborious, and complicated because of the conflict of the numerous inherent cross currents. These factors must all be harmonized under any health service plan. He would be a foolhardy man who thinks that they can be eliminated by the stroke of a pen through an act of Parliament or the plans of a body such as the Canadian Medical Association.

V-E Day has brought to the medical profession of Canada not only the ordinary responsibilities of good citizenship, but also the added necessity of facing our internal problems. If we fail to discharge those responsibilities, we will find that in the brave new world being planned for all of us we shall have lost our birthright. Therefore, I have made bold to speak words and thoughts which the "Gestapo" of medical opinion have so far forced underground.

Finally, may I indicate that the ideas and suggestions presented are my own. No one else or no organization should be held responsible for them, and I accept full personal responsibility.

615 Yonge St.

DISCUSSION

DR. A. F. VAN WART, FREDERICTON, N.B.

We are witnessing today a phenomenal spread over both Canada and the United States of the Blue Cross Voluntary Hospital prepayment plan. In endeavouring to find the cause of this rapid spread one cannot overlook the psychological factor. The contributor can visualize what his money is to do and where it is to be spent. It gives himself and his family hospital care when required and his entire contribution pays for his hospital care except for a small administration deduction. Contrast this with his contribution in taxes. He does not know where his tax payment goes. It may go for health services, new roads, fisherman's subsidies or to be used for political purposes.

Unfortunately the rapid spread of the Blue Cross plan has now reached the position that there is a lack of adequate hospital accommodation and many hospitals have not the equipment to provide the service which the insured is expecting to receive. It is not the place of the Blue Cross to finance new hospital construction, and hospital boards have not the funds. The need is too great for private philanthropy. Ultimately it becomes a government responsibility.

There is abundant evidence for the precedent of governments turning over to non-political lay bodies funds to be used in the administration of a national service. Why not then have the government turn over to a non-

political legalized organization sums of monies to carry out the construction program of hospitals and to aid in the betterment of their equipment? The present status of our hospitals need not be disturbed. They would receive monies, new buildings or new equipment from the board, to be used by their Hospital. Could not this new organization be enlarged to enable them to give consultative advice on hospital matters to our private hospital boards? Could not they take over the administration of our government-owned mental hospitals and tuberculosis sanatoria? Could not they take over the establishment of health centres and diagnostic units throughout the land? This organization by virtue of the B.N.A. Act must be Provincial in its scope. Could we not entrust to it the educational program of health services? Could we not give them power of supervision and responsibility of fostering and extending voluntary prepayment health plans?

There is no hard and fast line of demarcation between preventive medicine and curative medicine. Preventive medicine to be successful must spread over into the curative field, and curative medicine must adopt procedures and methods from the preventive field. Could we not then transfer the field of preventive medicine to this organization? This would involve the transferring of the Department of Health now existing as a government department to an outside non-political lay organization. This organization would then have available the services of those who have given such splendid leadership in public health. These men would find a place where their energies and thinking would not be fettered by political considerations, thus giving them a splendid opportunity to further the advancement of preventive medicine. The status of the present public health personnel would be considerably strengthened by the fact that their remuneration would not be put on the level of civil servants but on a level justified by their education, training and the responsibility of guiding a large health program. The organization we visualize must attract to it the best medical, professional and health-trained lay minds that exist in the country. To do this there must be adequate remuneration.

Could we not put under the care of this organization that large class of the population which Dr. Hannah states do not qualify for the voluntary service? In fact could we not transfer to it all of our health services? Let there be divisions for industrial medicine, Workmen's Compensation Board, nursing care, dental care, etc. An organization solely and truly responsible for our health services.

What then would be the position of the medical profession in this organization? It would have its representatives on all the administrative boards. Its present relations with voluntary organizations would not be altered. If individuals eligible for the voluntary schemes do not avail themselves of their services then the profession will treat them in the same way as their present private patients. With regard to the group of people who do not qualify for voluntary services our profession would confer with the health organization and develop a plan under which our profession would operate. Time does not allow me to discuss this further.

This proposal should give an organization which removes health services one step further from political control. It does not favour compulsion. It avoids the mistake of our educational fathers. These men placed educational administration in the hands of small municipal units. This resulted in the creation of low salaried teachers and inequalities of education in our communities, and created a very difficult problem for our modern educationalists. These men recognize that the larger units are essential to good education and that they are experiencing tremendous difficulties in endeavouring to get education out of the hands of the smaller units.

Let us explore the field thoroughly and endeavour to find if there is a place of fusion which may be the solution of our health services' problem. If it is found then let all interested bodies get together and co-operate in promoting the health services we visualize. The accomplishment of giving to Canada such health services will make for us a strong, healthy and virile country.

Men and Books

FIVE AGAINST OBLIVION*

By E. P. Scarlett

Calgary Associate Clinic, Calgary

Oblivion is not to be hired.
—Sir Thomas Browne.

One of the diverting things about history is that it abounds in instances of pleasant irony. Mackintosh is talked of when there is a shower of rain, Blücher and Wellington are remembered as much by boots as by battles. It is even possible that some day Gladstone may be thought of as a man who invented a bag. What could be more wildly absurd to the physician hemmed in by his scientific categories than to be told that from the world of medicine have come shorthand, Biblical criticism, Shakespearean commentary, a companion to the Dictionary, and a popular philosophy of success? And yet should he really be surprised? The physician whose daily business it is to regard the eccentricities of Man ought to show little wonder at the trivial or sublime eccentricities of History. It surely is the part of wisdom to welcome such fugitive beauty and to accept as part of the enchantment of history such accidents of time and circumstance.

Many centuries ago the author of *Ecclesiastes* wrote of the great comedy of life:

> I returned, and saw under the sun, that the race is not to the swift, nor the battle to the strong, neither yet bread to the wise nor yet riches to men of understanding, nor yet favour to men of skill; but time and chance happeneth to them all.

Illustrating the vagaries of recorded history, let us look at a group of medical worthies who have been granted a small measure of fame on what would seem to be the most tenuous circumstances. In each case what was regarded by their contemporaries as seemingly trivial has been exalted into significance by the whirligig of time. All practised medicine. Some became truants from their profession. All were relatively "little men" when judged by the imposing standards of historical achievement. But all have cheated oblivion and are remembered because of certain activities and interests which they followed outside the confines of medicine. They have achieved so to speak an extra-curricular immortality.

TIMOTHY BRIGHT [1551-1615]

It is surely rough poetic justice that a medical man should be the father of shorthand. Here is the complete answer to all those idle jokes about the hieroglyphics of prescriptions and the

* Read at the Seventy-sixth Annual Meeting of the Canadian Medical Association, Section of Historical Medicine, Montreal, June 13, 1945.

bad writing of physicians. This fact seems to have gone largely unnoticed and it is high time that the figure of Timothy Bright, "doctor of phisicke", should be brought out of the shadows of the past.

Bright was an almost exact contemporary of Shakespeare, and like the educated men of that day ranged over a wide field of learning and experience free from the trammels of specialism and other modern fanaticisms. He was born and educated in Cambridge, "a Cantabrigean both by birth and the ordainment of my life", he writes of himself. Going on to Paris for further medical study, he escaped death during the massacre of St. Bartholomew by taking refuge in the house of the English ambassador, Sir Francis Walsingham, where one of the household was young Philip Sidney. This event strengthened in him the Reformation principles which he had gained at Cambridge. He returned to England to practise medicine in or near Cambridge, gave medical lectures at the University and started to write. His first three books were medical treatises, his fourth a philosophical work, *Animadversions on Scribonius*, dedicated to "that mirror of true knighthood", Sir Philip Sidney. Within ten years we find him in London as physician to St. Bartholomew's Hospital, the third regular physician in the line. But in medical doctrine he was no forerunner of his famous successor in that post, William Harvey, for he was not at all touched by the dawning experimental viewpoint and method in medicine. Indeed the historians of "Bart's" have wry words for him. Dr. Norman Moore remarks that although not unread, Bright "shows no real learning and had little mother wit". Sir James Paget from his medical tower writes that Bright's theology was much better than his physic. These comments, it seems to me, do less than justice to a many-sided Elizabethan who was possessed of a spark of eccentric genius. In an age when metaphysics and medicine were hopelessly entangled, Bright's inclination was to the former. It was characteristic of him, therefore, that in the year after moving to London he should publish the *Treatise on Melancholy*, (1586), a book that influenced the celebrated "Anatomy" on the same subject then taking form in the mind of the sedate don of Christ Church, Robert Burton. Critics have also ascribed some of Shakespeare's psychological knowledge to his reading this book.

Possibly the salary and allowances at "Bart's" were not sufficient to support a wife and four children. More probably beneath this Tudor doctor's jacket breathed a man of great ingenuity. Under whatever compulsion Bright started to work out a scheme of "quick and compendious writing" and in 1586 he submitted a sample to young Robert Cecil, a copy of the *Book of Titus* in the new "characterie"—vertical columns of symbols like Chinese. Thus the precincts of St. Bartholomew's Hospital are the true birthplace of shorthand. He revised his system and in 1588, the year of the Armada, he was granted a special royal patent for his invention by Queen Elizabeth. In the same year he presented his discovery to the world in a book bearing the following title:

> "Characterie. An arte of shorte, swift and secret writing by Character. Invented by Timothe Bright, Doctor of Physike."

The invention bore the term "characterie" as originated by Bright and was called "short writing" for a long time. His scheme was on an alphabetical basis, but the signs for the letters were not sufficiently simple to be joined to one another. It was not until 1602, fourteen years later, that John Willis made the improvement which served as the foundation for all later systems. Bright's invention was turned to practical account at once to record the sermons of the great preachers of the day for publication. Whether it was used by pirating publishers to acquire the text of the current plays of the successful Mr. William Shakespeare is a matter of speculation.

In Bright's age and in the century which followed man has never shown himself more plainly a "great amphibium" capable of living in two worlds at once with no consciousness of any serious conflict. Sir Thomas Browne is the classical example of the period, hovering midway between the ancient world of metaphysical thought and the dawning world of rational materialistic science. Bright for his part apparently found this philosophical position uncongenial and after five years of medical practice in London abandoned medicine and took holy orders. For a time he served in a parish in London and later was rector in two districts of Yorkshire, but his theological career seemed to have been an indifferent one, and it must be sadly recorded that he was constantly quarrelling with his parishioners. It is likely that he was more interested in metaphysics than in pastoral duties, and his habit of busying himself with natural science and medical matters and his books and his "characterie" could have left him little time for the work of his parish. But he went on to the end speculating and reading. He died at Shrewsbury in 1615 at the age of sixty-four. In his will he left his library to his brother to whom he also bequeathed "my instrumentes of musick called the Theorbo, wth its case, and the Irish harpe, w^{ch} I most usuallye played upon". To his son Titus he left "the rest of my Instrumentes of musick".

Bright's medical labours have been long since forgotten, his work on melancholy has been superseded by Burton's classic, and his *Characterie* is now only a bibliographical curiosity. But he was a true Elizabethan, following his medical interests, speculating upon divinity, experimenting with his strange symbols, writing his books and discoursing melody on his "in-

struments of musick''. It is significant too that the parish register of St. Mary's, Shrewsbury, in the entry recording his death reads: ''Timothy Bright, Doctor in phisicke''. For with all his crotchets, medicine seems to have been his main interest. He was undoubtedly an individualist, probably a difficult man as the saying goes, if we remember the quarrels with his parishioners, on whom he probably looked with the somewhat cynical eyes of a man schooled in the medical world. Whatever the case, I cannot think that Bright's ghost thumbing his books on divinity which was so much part of his physic and taking his recreation with his ''characterie'' figures and his ''instrumentes of musick'' will be vexed at this tribute.

JEAN ASTRUC, [1684-1766]

Talleyrand once remarked that only those who had lived in France before the Revolution had really experienced *la douceur de vivre*. It was the classical world of the eighteenth century with its self-assurance, its brilliant society, its eager faith in reason. There were clouds on the horizon but the storm had not yet broken. It was an atmosphere in which there could develop great activity in the arts and the sciences. Men were busy codifying knowledge and in particular some of the best minds of the time were giving their attention to history.

Jean Astruc was thus happy in the age into which he was born and it must be said that he returned the debt in good measure. Unlike Timothy Bright he is a considerable figure in medical history. An eminent medical practitioner, royal physician, teacher of medicine, writer of voluminous medical works some of which are classical, he is best known within scholarly circles as the historian of syphilis and midwifery. But the world at large remembers him for none of these things today. A singular critical inquiry which he made into the field of theology has kept his name alive, and it is for that reason that he is included in this gallery of characters.

Astruc was a great encyclopædist, a scholar versed in many languages and a prodigious worker. ''He might be seen'', a contemporary writes, ''in the coldest winter night at an advanced age studying at three in the morning without a fire by the light of a lamp''. Born in southern France in 1684, the son of a Huguenot minister, Astruc was brought up as a Catholic, his father having renounced Protestantism about the time of the revocation of the Edict of Nantes. He went to Montpellier as a student of medicine and from then on, as he says, sacrificed everything to the ''pleasure of study and observation''. His career was marked by a progression of high appointments and honours. From Montpellier he went to Paris where he was elected to the chair of medicine in the Royal College, was a member of the Faculty of Medicine, and consulting physician to the King.

His greatest medical work is the *De Morbis Veneris*, a mine of historical lore concerning syphilis. Incidentally Astruc defended the American origin of the disease. His other best known medical books are the *History of the Faculty of Medicine of Montpellier*, the *Manual of Midwifery* and the *Treatise on Diseases of Women*. In his book on midwifery Astruc modestly begins by explaining that he had never attended a case of labour, but had been asked to give a course of lectures on the subject by the Paris Faculty. As may be imagined, the book is full of quaint conceits, the best part being the historical introduction on the development of midwifery from the time of Adam and Eve. In a letter appended later to the *Manual* he explains how God came down to give Adam and Eve the first lesson and speculates on how they tied the umbilical cord.

Here then was a questing mind which had in a sense taken all knowledge for its province, a mind accustomed to critical inquiry and historical research, and it was natural that it should follow other pursuits when not working on medical problems. In 1753 there was published in Brussels a small octavo volume which is now known as the *Conjectures*, which examined in critical fashion the composition of the Book of Genesis. The author was Astruc but because at the time the fires of religious intolerance were burning brightly, the book was published anonymously. The *Conjectures* is generally considered to be the foundation of Old Testament criticism. Astruc's approach was conservative and entirely within the bounds of even the strictest orthodoxy of the time. His preface is apologetic and he protests that if any authorities find his ideas false or dangerous, he is ready to abandon them. He regards the scriptures as sacred and part of the divine revelation, and he takes occasion to censure that robustious physician, Rabelais, for his ''impious allusions'' to the Bible. He accepts Moses's authorship of the Pentateuch and after much speculation concludes that Moses obtained his knowledge of events back to Creation from records left by his ancestors and from oral tradition. Using as his text the Geneva version of the Bible, he then proceeded to arrange Genesis in columns, taking as his guide those passages in which Elohim occurs as the name of God and those in which Jehovah is the name used. He finally goes on to show how such a view of the book clears away many of the difficulties of commentators. Such is the Astrucian foundation of Bible criticism. It was the work of an amateur but it provided the clue to the analysis of the Pentateuch and it has stood the test of time.

Astruc was thus no robust sceptic like Voltaire. The swirling currents of thought and criticism which were to lead to the final destruc-

tion of the feudal order in Europe left him untouched. To his death at the age of eighty-two he remained absorbed in his studies and his medical work, an amiable, wise old man, retaining in a time when hatreds were rife the respect of all his colleagues. It is certain that he never realized that his book, the *Conjectures,* so apologetically presented to the world, had opened to theologians a path that was to lead to a new field of thought in religion and to bitter controversies that continue to this day. It is even doubtful whether he would agree with us that in his work there is a debt which theology owes to medicine.

THOMAS BOWDLER, [1754-1825]

It is high time that someone should put the record straight as far as the unfortunate Thomas Bowdler is concerned, and as Bowdler was a graduate in medicine and practised his profession faithfully as long as his physical powers and his inclinations permitted, it is no impertinence that a medical man should address himself to the task. The "tattle of time" has been most unkind to his memory. Critics and commentators have been uninformed and intemperate and have used a man of the most modest pretensions as a whipping-boy to display their lordly sophistication. In at least one respect Bowdler has maintained the advantage. These same critics have given him the rare privilege of having his name added to the English language and he is now in that motley company of nineteenth century figures which include Mrs. Bloomer, Wellington, Mackintosh, Burke, Boycott and Brougham. But even here Bowdler has been victimized. The word "bowdlerize"* which appeared about ten years after his death was used at first to mean officious meddling with a text, but it soon suffered degradation, coming to mean exaggerated squeamishness and finally ruthless censorship based on an unhealthy imagination. This is indeed a flagrant distortion of Bowdler's aims, his work and his personality.

The truth is that Bowdler by no stretch of the imagination can be regarded as a moral musketeer. The chronicle of his life is as unexciting as that of any respectable gentleman of the parish. He was born at Ashley near Bath in 1754 of an old family of independent means. The family line combined grave piety, the genteel tradition and a certain literary faculty, qualities that Bowdler faithfully exemplified. At the age of nine he suffered an accident, the effects of which were to afflict him for the rest of his life. He entered St. Andrews University and later the University of Edinburgh from which he obtained his degree in medicine in 1776. There followed the usual "grand tour" of Europe, and we get a glimpse of the serious-minded young man in a letter in which he describes Vienna at this time as "the place which a young man of rank and fortune could make his residence, with the most favourable prospect of improvement, and the least danger to his principles and morals." He returned to England to medical practice, but within five years of graduation, following a severe bout of fever which he acquired while attending a friend in the course of a journey to Lisbon, he found himself broken in health and forced to abandon medicine.

He continued to live in London where he directed his energies to other pursuits. He became a Fellow of the Royal and Antiquarian Societies, a distinguished member of one of the leading chess clubs, an ornament of Mrs. Montagu's sprightly and decorous circle. This was the age of society par excellence when the upper classes enjoyed life with zest and like Charles Fox lived "happy". Bowdler followed the more polite pleasures of the day and we can see in him one of those more temperate souls who brought to the society of his time the evangelical influence that laid a restraining hand on all classes and later in the Victorian period was to produce a heavy puritanism, seriousness of thought and a stern scrutiny of conduct. He devoted himself to philanthropic work. As his *Memoir* states, he "had imbibed an hereditary desire to be doing good; and happily the metropolis affords abundant opportunities of exercising benevolence". Prison reform, hospital administration, church work, were mingled with travel expeditions and occasional pedestrian writing heavy with moralizing. He finally took up residence near Swansea where he lived the life of a small squire and a model man of the family.

It was in this environment that he conceived *The Family Shakespeare* which was to make him immortal and which was published in ten volumes in 1818 when Bowdler was sixty-four years of age. His aim is stated in a famous passage from the preface:

> "It certainly has been my wish, and it has been my study, to exclude from this publication whatever is unfit to be read aloud by a gentleman to a company of ladies. I can hardly imagine a more pleasing occupation for a winter's evening in the country than for a father to read one of Shakespeare's plays to his family circle. My object is to enable him to do so without incurring the danger of falling unawares among words and expressions which are of such a nature as to raise a blush on the cheek of modesty, or render it necessary for the reader to pause, and examine the sequel, before he proceeds further in the entertainment of the evening."

Altogether an admirable idea, as anyone who has read Shakespeare aloud will testify, albeit stated with an almost comic absence of humour.

It is important to examine the text of the work and note what he did. He was no "root

* The term "bowdlerize" first occurs in *Letters of a Representative to his Constituents* written in 1836 by Perrouet Thompson. The passage: ". . . there were certain classical names in the writings of the apostles which ultra-Christians would probably have 'bowdlerized' ".

and branch'' expurgator. He dropped or corrected on the count of profaneness and indecency expressions or passages which were tolerated in the sixteenth century but have become offensive to later generations. He did not rewrite Shakespeare, for whom he had the highest veneration. We find, for example, that *Hamlet* is deprived of not more than two dozen lines, and *Measure for Measure* pruned of its stupid indecency without any harm to the play. It was altogether a very harmless performance, which has been repeated scores of times since by editors of the high-school texts of Shakespeare in modern times.

The sale of the work was immense and sustained, and it became an institution. The critics attacked it and made Bowdler's name a byword, the notable exception being no less than Swinburne who, writing in 1894, defended Bowdler and expressed the opinion that in reality he had done Shakespeare great service. In short the attitude of the critics and of succeeding generations to Bowdler's work savoured of hypocritical cant, and if today the world needs no such edition, it is for the shameless reason that the practice of reading Shakespeare aloud is dead.

It is thus surely apparent that Bowdler was no vigorous reformer like his contemporary, the rough William Cobbett. Nor does he remotely resemble his modern prototype, the flaming inquisitor, Anthony Comstock, whom Heywood Broun once termed ''the roundsman of the Lord''. He was an inoffensive, respectable man with little or no humour, taking himself and the world with a seriousness that could express itself in a letter to a friend in these words:

> ''. . . the mild spirit of Christianity, as it is taught by our Established Church, is calculated not only to render us better, but to render us happier even in this world, and certainly to give us the hope of eternal happiness hereafter.''

In his seventy-first year, after completing in spite of many infirmities a purified version of Gibbon's *Decline and Fall,* Thomas Bowdler passed out of the wicked world of George IV. Posterity has surely never given such a wry reward to a man of high character whose only offense was that he was well-intentioned and—it must be confessed—a trifle dull.

PETER MARK ROGET, [1779-1869]

There are, it must be admitted, slight chances of lasting fame in the world of science. The cause is all, the individual of little account. As a result in medical history only a handful of names remain to us. If one is looking for an enduring monument, he had better be a popular inventor or write a poem or (remembering Pepys) keep a diary. When we turn to the figure of Dr. Peter Mark Roget we find merely a shadowy ghost so far as scientific and medical history are concerned. And yet for over half a century he was a distinguished medical celebrity in the life of London. But he is alive today because among other activities he had a hobby, which was, playing with words. He was a lexicographer but he gave that austere calling a novel turn.

His life was a full and varied one. Son of the pastor of the French Protestant Church in Threadneedle Street, his mother the only surviving sister of Sir Samuel Romilly, he was born in London in 1779, and attained the satisfactory age of ninety. His father died when he was a small child and his mother devoted her life to Peter and his sister. At an early age he entered the University of Edinburgh which was then in its golden age. Cullen was gone but the medical faculty still included Black, Munro and Gregory. After getting his medical degree he returned to London for further instruction under Baillie and Cruikshank at the Windmill Street School, William Heberden at St. George's and Abernethy at Bart's. There followed five more years of travel and scientific study. In 1805 he settled in Manchester where he was physician to the Royal Infirmary, was one of the founders of the Manchester Medical School, and delivered lectures in physiology. Through these and later professional and popular lectures, and his publications Roget did much to bring physiology within the medical curriculum. After four years he moved to London where he was soon absorbed in a score of interests. The man seems to have had a restless ''dæmon'' that drove him on. He had a large professional practice, did dispensary work for years, lectured on the theory and practice of physics at the Medical School in Windmill Street. He later held professorships in physiology at several London schools and in the Royal Institution.

He was a member of many societies and was the Senior Secretary of the Royal Society for over twenty years. He was one of the first to give popular lectures on natural history, a practice that later was to make Huxley's reputation. He acted in a medical capacity on government commissions.

And all the while he was writing: articles on literary matters, on natural history in the *Encyclopædia Britannica,* on mathematics, optics and electricity, on old age, on asphyxia and matters of physiology, popular treatises for the Society for the Diffusion of Useful Knowledge which he founded. This did not exhaust his talents for he demonstrated his mechanical aptitude by inventing a logarithm slide-rule and in later years a delicate balance. He also spent much time working on a calculating machine. He was a mathematician of standing and one of the best chess-players in the kingdom. Indeed he solved many intricate chess

problems never previously worked out, and to cap it all published a pocket chess-board.

As early as 1805 he was working with words and projected a system of verbal classification to assist him in his own writing. With his retirement from professional practice and later when he gave up his secretarial duties with the Royal Society, he went to work in earnest on his *Thesaurus* which he published in 1852. It reached the twenty-eighth edition in his lifetime and has now become an institution in the English-speaking world. It is pleasant to note that first his son and then his grandson continued editorial supervision of the book and that after over ninety years it is still published in London by the same firm, Messrs. Longmans Green & Co., as when issued originally.

The book represents not only "the labours of the mine" but the avocation of a studious leisure. It has enriched the verbal treasury of generations. It set out to be a guide and aid; it has become a god-send to the dunce and to every writer who on occasion bogs down at the difficult task of marshalling words. It has been and is companion to thousands and one feels an affection for it as for no other technical book. I always like to think of the venerable Doctor Roget continuing to add words and phrases to the collection until his death. It makes the *Thesaurus* in a special way a projection of himself.

In the *Atlantic Monthly*, September, 1906, there appeared the following verses:

TO PETER MARK ROGET

You would think to overpower us
With your wordy old Thesaurus,
Your book of words and phrases to amaze us and excite;
A revised, enlarged edition
Minus error and omission—
Oh, Peter Mark Roget, you, what say you when you write?

Tell me, when you went a-courting,
All your adjectives assorting,
Did you write her carefully and prayerfully this strain?
"I love you, like and sympathize,
I burn, adore, hug, idolize;
I'm your lover, suitor, wooer, beau, pursuer and your swain!

"You endear, you charm and capture,
You seduce, bewitch, enrapture;
My thoughts and cogitations, meditations, sentiment,
Are about, as to, related,
Quod hoc, associated
With you, yourself, the same as, your name, as evident."

Did you ever stumble, hesitate,
Cut short, shut off, abbreviate,
When you told her you aspired to and desired to be her HIM?
When she received and took you
With your volume, tome and book, you—
Did you care a fig, be partial to, concerned with Synonym?

Oh, Peter Mark Roget, you
Have decreed we shall obey you,
For ever in the choosing and the using of our speech;
But when I become a wooer,
I shall send your volume to Her,

	inamorata	
	lady-love	
	idol	
	darling	
	duck	
	Dulcinea	
And let her choose her title—	angel	
my pretty little.....	goddess	PEACH.
	cara sposa	
	fiancee	
	affianced	
	betrothed	
	coquette	
	flirt	
	turtle-dove	

Fate led Peter Roget to earn his living as a doctor and man of science but he compiled his *Thesaurus* for love. I rather fancy that when he stood at the gate of eternity, he did so armed with his *book* and not with his stethoscope.

SAMUEL SMILES, [1812-1904]

A man is coloured by the age in which he lives. Bright was the individualist of the English Renaissance; Astruc possessed in some degree the spirit of eighteenth century rationalism; Bowdler was the earnest philanthropist of the early nineteenth century; Roget in his many-sided curiosity and competence, his industry and liberalism was the typical figure of the mid-Victorian period. And when we turn to the final member of this quincuncial group of worthies, Samuel Smiles, we find a man who more than any of the foregoing mirrored the qualities and temper of his time.

The recording angels of literature have written down Smiles as a boring sentimentalist. That judgment may be fair enough in literary perspective, but it dismisses in too summary a fashion a figure who was important in his day and whose name is still used to denote a certain type of philosophy. Smiles was of the breed of men who were the grandfathers of the present generation, and most of us grew up in the shadow of that dispensation. The father of the household was known as "the master", the gold chain across the waistcoat of broadcloth was the seal of respectability, life was regarded as a branch of personal religion. It was the era of "muscular Christianity", of the beard and the pipe, of an assured belief in progress, of popular education. The real strength and merit of the period lay in the self-discipline and initiative of the individual, cardinal virtues of the Puritan tradition so much derided today, but virtues of a way of life which produced formidable figures in every walk of society. "Self-help" was a favourite motto with all classes. By industry, stern conduct of life, and education, men believed that they could reach their goal in life. Because Samuel Smiles was the perfect embodiment of

this gospel, we still may have a vital and affectionate interest in him today. He was the popular prophet of a period in our social history, an earlier voice in the movement which has broadened into the popular education of today. He was the sturdy exponent of a gospel which in a more diluted and adolescent form on this continent gave rise to the so-called Horatio Alger tradition.

The life of Smiles can be divided into three sections. The first covers his years in medical practice, the second his career as a business executive and the third his work as an author and popular lecturer. He was born in the old East Lothian town of Haddington, the birthplace of John Knox. He was the oldest of eleven children and his boyhood at home and at grammar-school was the typical one of the time. Of the discipline of these early years Smiles writes in his *Autobiography*:

"We had to work very hard on the so-called day of rest. In the morning, after prayers, we had to learn the 'carritch' and a 'paraphraze'. Then we went to the kirk, and after singing and prayers, we listened to a sermon often more than an hour long, and got out at one. After refreshment we went to kirk again at two, heard another sermon, and were dismissed at four. Then we had to say our catechism and paraphrase. There was actually a third sermon at six o'clock; we got home at eight, and again said our catechism and paraphrase. We had no sort of recreation on Sundays. Walking, except to the kirk, was forbidden. Books were interdicted, excepting the Bible, the Catechism, and the Secession Magazine, or perhaps some book of evangelical sermons."

When he was fourteen he was apprenticed to a firm of medical practitioners in the town.

"There was not much to be done in my new vocation", he writes. "I had to learn the nature and the qualities of drugs, and how to make up prescriptions, pills, mixtures, potions, ointments, blisters, infusions, tinctures, and such like. In course of time I learnt the arts of bleeding and bandaging. I had to assist in attending to the poorer class of patients. I also went on with my own education. There were plenty of libraries in the town, and I used them freely."

He matriculated at Edinburgh University where he continued his medical education. In the same class was a fellow-townsman of whom he writes: "One of my friends, a fellow-attendant at Dr. Fletcher's lectures, was John Brown—afterwards the celebrated author of *Rab and His Friends*. He was then in a jacket, a fellow of infinite humour, though very shy. It was some time before one could get into his nature." Smiles had no difficulty with his medical work. The examinations conducted *viva voce* consisted in constructing a passage of Celsus, a dash of materia medica and anatomy, the description of reducing a hernia and amputating a leg, and some details of physic. "I got through without difficulty," says Smiles, "and had the pleasure of receiving my diploma, dated 6th of November, 1832—six years exactly after the date of the indenture of my apprenticeship."

He returned to general practice in Haddington but his interests and ambitions went far beyond the routine of his profession. He supplemented his income by lectures on chemistry, physiology and health, and acquired the fatal habit of writing, contributing to the Edinburgh papers and later publishing at his own expense his first book *Physical Education*. Medical practice did not satisfy him, chiefly because it was too exacting for a man with his many active interests. Years afterward he wrote:

"It used to be said of doctors that they rarely got bread enough to eat, until they had not teeth to eat it. Medical men are to a certain extent the slaves of the public. While persons in other professions spend their evenings in peace, doctors are obliged to work by night as well as by day—sometimes by night more than by day."

After six years he resigned from medical practice and became editor of the *Leeds Times* in which he pressed the cause of reform and started giving popular lectures which were to be the basis for his future books.

Five years later he returned to medical practice in a town near Leeds but this proved to be only an interlude, for he finally abandoned medicine after two years and became Secretary of one of the railway companies in Northern England in which post he remained for over twenty years. He now devoted more time to pubic affairs, popular lectures and writing. He explained his ability to carry out so many activities in characteristic words:

"It all arises from the frugal use of time; and by the thought that when once passed it can never be recalled. *Pereunt et imputantur*—'The hours perish and are laid to our charge'—as is written on the dial of All Souls, Oxford—a solemn and striking admonition to all men."

After writing on a variety of subjects, much of it literary hack work, he turned to biography, not, it should be noted, because it offered good financial returns, but for the more sober and Smilesian reason that concrete examples of men who achieved great results by their own efforts were the best indication of the true direction of social progress and were salutary models for those struggling to acquire knowledge. Smiles had now found his true forte. In 1857 with his *Life of George Stephenson* he became known as a successful writer, and in 1859 when his first book on the conduct of life and the acquiring of knowledge and culture was published, its sale was meteoric. This treatise (for such we must call it) which was entitled *Self-Help, with Illustrations of Character and Conduct* made Smiles known throughout the world and established his name as a by-word. There followed a series of similar books—*Character, Thrift, Duty, Life and Labour*—but none as successful as the first. He also continued to write biographies and divided his time between literature and travel.

In 1871 when he was fifty-nine years of age he suffered a serious break in health but his sturdy spirit and optimism brought him around within a year's time.

Here then was a man who practised in a very real sense what he preached, and his life is the best commentary on his writings. He continued to the end busily engaged in writing, taking an active part in political and social reform, interested in the rapidly changing face of the world about him. He achieved the happy privilege of a serene old age, spending his last years in the writing of a modest autobiography. He died in 1904 at the age of ninety-two. The spacious days of the reign of Queen Victoria were at an end, and a new and troubled era, too complex for the simple philosophy of Samuel Smiles to compass, was beginning.

The real Smiles was a compound of industry, learning, love of scribbling, courage, innocence, humility and true Scots integrity. Essentially his was a simple mand and his writing was for the most part pedestrian journalism, in complete contrast to his countryman and contemporary, Thomas Carlyle. His ruling passion was industry and perseverance which the rugged Carlyle called "the hinge of all the virtues". He shared the Victorian belief that the world is no featherbed for the repose of sluggards. There would be plenty of time in eternity in which to rest. Meanwhile happiness was to be found in work under "the great Taskmaster's eye". He did not share in the intellectual movements which were rising in his later years but moved in a more humble and a simpler orbit. His was the popular home-spun version of the original forces that had sustained the hope and the energy of the nineteenth century, and it was his achievement to make those ideas known to the common man who for the first time had education within his grasp.

Samuel Smiles was thus one of the first successful popularizers of knowledge (to use an ugly phrase of the present day). He tapped a vein which was later to be worked with enormous success and devastating results by Lord Northcliffe and a motley multitude of modern writers. The difference between Smiles and most of his successors must be noted, for it is as wide as the heavens. Smiles dealt in honest home-spun through which ran the strong cord of moral purpose and integrity. The modern versions of *Self-Help,* scorning such a childish title, blossom under titles of cheap sophistication, and give their customers glittering tinsel and tawdry coloured cloth of no pattern whatever. The race of men desires to be better, and so they are given instruction in how to be better without indicating what "better" means, in which method is everything and object nothing, except success which presumably is power and money, and in which the simple rule of success is confidence that you are going to be successful. In this modern dispensation "better" presumably means bigger ideas, brighter emotions, better opinions borrowed from some one else, better ice-boxes and bath tubs. In a word, the Smiles philosophy has been completely vulgarized and debased. It is a sad legacy, and Smiles would have been revolted by it.

Samuel Smiles is a truant from medicine who felt that he could express himself better outside the confines of his profession. That was an honest impulse and he acted upon it. The medical truant thus released looked at the world and what might be achieved in its arena. He not only pondered success and the means to achieve it, but he asserted the fundamental values of life which that success must incorporate. He maintained his earlier Hippocratic principles. After all, his grandfather had been an elder and a Cameronian preacher, and the stern morality of his Scots ancestry saved him from an easy acceptance of the world and from an unbridled delight in the fat pastures of Canaan.

* * * *

This chronicle has been little more than a slight excursion into the imagined realms of other centuries to which distance lends a large measure of enchantment frowned upon by the categorical scientific mind. But I am bound to state that the contemplation of human beings in the past invariably takes on this atmosphere, and that, whatever we may say about the vagaries of time and history, at least time makes some recompense to us by shedding on all things human and of the past a magic and iridescent light we call romance.

> "O no man knows
> Through what wild centuries
> Roves back the rose."

The question of course that haunts us in such an inquiry as this is: what is the passport to abiding fame? By what criteria has time made its selection? Genius for the most part needs no Old Mortality to clear the lichen from the letters on its tomb. It is its own warrant-royal in whatever sphere. And then there are the political and military figures who are in the company of the remembered because until recently recorded history has concerned itself with the squabbles of the last two thousand years. And the writers survive because of the power of words to move multitudes. There are the dreamers and those who have given the world new ideas and ideals.

> "We are the music-makers, and we are the dreamers of dreams,
> Wandering by lone sea-breakers, and sitting by desolate streams. . . ."

But some names such as the ones we have been considering have been wafted down to us on the most slender claims. And now with the

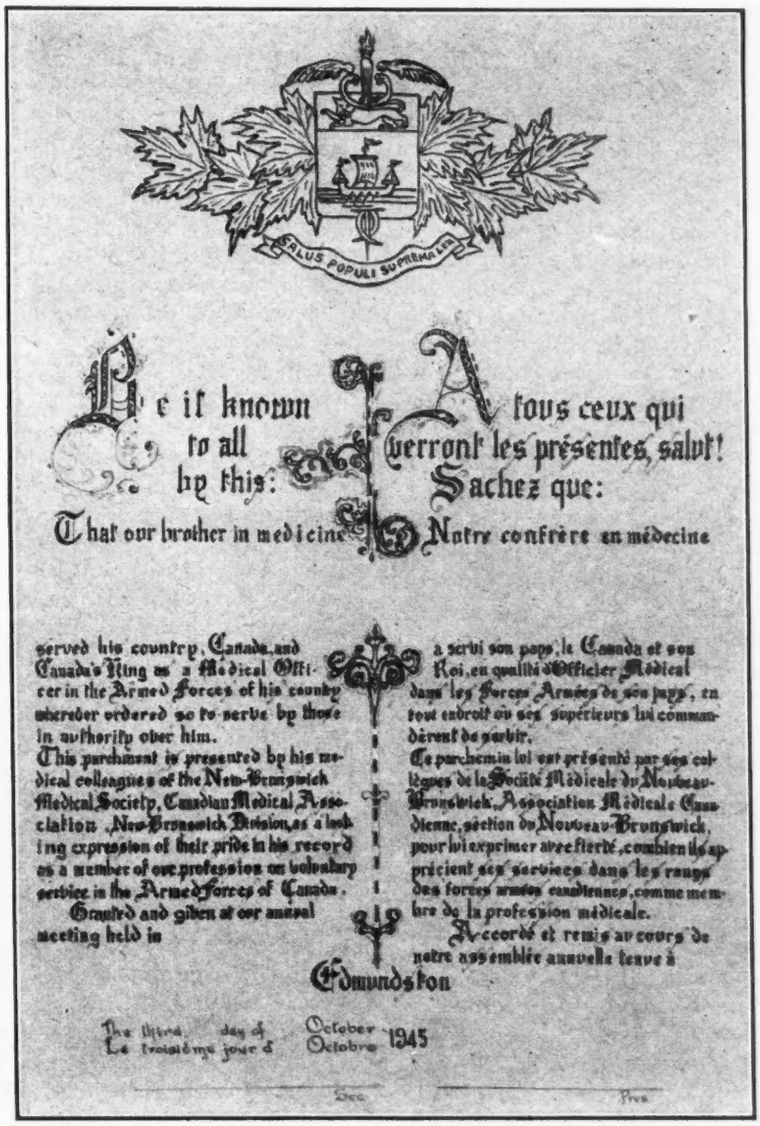
growth of what is called social history, historians are praising not only "famous men" but "our fathers that begat us". There is a great dusting of the shelves in the museum of history. Obscure figures are being brought into the light, and human history is becoming more like a great human comedy than what it has been for so long—a dull pageant.

The truth of the matter is that gold is where you find it. And gold, being one of the attributes of humanity, may be found above or below stairs. So that gossip about characters who are unknown to the general has its value. What time will do with it is another matter. As we have pointed out, the workings of time and the spirit of man elude our intellectual grasp. The wind bloweth where it listeth, and we can only take refuge in the comfort of poetic paradoxes and (it must be confessed) in the shrug of a wistful fatalism.

Divisions of the Association

New Brunswick

We take pleasure in reproducing the illuminated parchment which is being presented by the New Brunswick Division of the Canadian Medical Association to all members of that Division who have been on active service in the present war. We understand that presentation of this memento will be made, so far as is possible, at the annual meeting of the Division this month.


SALUS POPULI SUPREMA LEX
Be it known to all by this:
That our brother in medicine
served his country, Canada, and Canada's King as a Medical Officer in the Armed Forces of his country wherever ordered so to serve by those in authority over him.
This parchment is presented by his medical colleagues of the New Brunswick Medical Society, Canadian Medical Association, New Brunswick Division, as a lasting expression of their pride in his record as a member of our profession on voluntary service in the Armed Forces of Canada.
Granted and given at our annual meeting held in
Edmundston
The third day of October 1945
A tous ceux qui verront les présentes, salut!
Sachez que:
Notre confrère en médecine
a servi son pays, le Canada et son Roi, en qualité d'Officier Médical dans les Forces Armées de son pays, en tout endroit où ses supérieurs lui commandèrent de servir.
Ce parchemin lui est présenté par ses collègues de la Société Médicale du Nouveau-Brunswick, Association Médicale Canadienne, section du Nouveau-Brunswick, pour lui exprimer avec fierté, combien ils apprécient ses services dans les rangs des forces armées canadiennes, comme membre de la profession médicale.
Accordé et remis au cours de notre assemblée annuelle tenue à
Le troisième jour d'Octobre 1945
Sec.
Pres.

Medical Societies

Canadian Society for the Control of Cancer

A Special General Meeting of the Members of the Society will be held at the Head Office of the Society, 24 Bloor Street East, Toronto, Canada, on Monday, October 15, 1945, at the hour of 11 o'clock in the forenoon, for the purpose of considering and, if thought fit, sanctioning By-law No. 30 of the Society, being a By-law entitled "A By-law to Change the Name of the Society to 'Canadian Cancer Society' ", passed by the Directors on June 29, 1945, and for the transaction of such other business as may properly be brought before the meeting.

Dated at Toronto, September 5, 1945.

JEAN E. PIERCE, *Secretary,*
Canadian Society for the Control of Cancer

The North-Eastern Saskatchewan District Medical Society

The North-Eastern Saskatchewan District Medical Society held a meeting in the Yorkton General Hospital on May 9. Officers for the ensuing year were elected and are: *President*—Dr. P. Potoski; *Vice-president* — Dr. O. A. Turner; *Secretary-Treasurer*—Dr. M. C. Novak. Hon. Valleau was present at the meeting and discussed several medical matters pertaining to preventive medicine and old age pensioners. Dr. C. J. Houston reported further on progress made by the Health Services Planning Commission. Consultant referees for accounts *re* beneficiaries under the Health Services Act were appointed, Dr. G. A. Paille, of Melville, Dr. J. G. Warren, of Canora, Dr. N. Rollins, of Wadena, and Dr. M. C. Novak, of Yorkton.

* * * *

A further meeting of the North-Eastern Saskatchewan District Medical Society was held on August 1 at No. 23 E.F.T.S., Yorkton, preceded by clinics at the Yorkton General Hospital. Wing Commander L. G. Bell addressed the meeting on "War-time medicine".

Ontario Medical Association

The District meetings of the O.M.A. began in Fort William and Port Arthur on September 6, 1945. This meeting was held in conjunction with the Lakehead Summer School and an extensive and well planned program carried out. The clinics and lectures were provided by Dr. A. G. McGhie, of Hamilton, Dr. A. D. McLachlan, Professor of Surgery, University of Western Ontario, London, Ont., Dr. A. K. Stuart, of Hamilton, and Dr. William Magner, of Toronto. Three full days were occupied with the scientific programs with a business session on the evening of September 7.

In North Bay a two day meeting was held with Dr. Keith Stuart, Dr. McGhie and Dr. McLachlan as leaders in the scientific programs. Dr. Magner was guest speaker at the dinner held on the evening of September 10. On September 11 a morning session was given to consideration of many problems in a business meeting.

Special Correspondence

The London Letter

(From our own correspondent)

THE NATIONAL HEALTH SERVICE

In retrospect, the debates at the Annual Representative Meeting of the British Medical Association at the end of July seem a little unreal. Indeed, as the results of the General Election were being announced during the last day of the meeting it became obvious that the big change in the political situation might mean a big change in the structure of the new service. No one, however, was quite prepared for the way in which the spokesman of the government, Mr. Arthur Greenwood, himself an ex-Minister of Health, put the cat among the chickens. He described the way in which the plans for a health service had been left by Mr. Willink (Minister of Health in Mr. Churchill's administration) as a "terrible muddle" and with a fine disregard for accuracy spoke of discussions with the British Medical Association behind the backs of everybody else.

Such a statement, combined with an announcement that it was proposed to start once again back at the original plan of the White Paper is not likely to produce in the medical profession a friendly and co-operative spirit. Indeed it confirms what many have feared, namely that the health service—and in the long run that means the intimate relationship between doctor and patient—will be tinged with political prejudice. This is to say the least a great pity.

The true facts are that there were many matters in the White Paper left open for negotiation, that Mr. Willink has spent a long time discussing such matters not only with a representative body of the whole medical profession (only a proportion of which directly represented the B.M.A.) but also with representatives of the voluntary hospitals and of the various local government associations, and finally that not one of these bodies liked the proposed administrative set-up.

It would remove a lot of misunderstanding if the report of the negotiations was now made public. It would then be seen that to talk of concessions to a reactionary B.M.A. is sheer nonsense.

MILK AGAIN

In one respect the new government has a better reputation than conservative administrations in the past—it believes in the value of pasteurization of milk. Up to recently it was thought that the coalition government had really settled this matter. When the right to choose the milkman for retail sale of milk was taken away in order to save labour and petrol it became clear that it was unfair to forbid people to buy safe milk and equally clear that the next logical step would be compulsory pasteurization of all milk. As far back as 1943 this was in fact announced as the official policy, with milk from tuberculin-tested herds and another group called "accredited" herds being excepted. But although it was realized that plant and labour for universal pasteurization could not be available until after the war it was certainly believed that all preparations for this were being proceeded with.

An official has now revealed that very little has, in fact, been done. At the B.M.A. annual meeting there was an almost hysterical outburst of debate on the milk situation and it certainly is enough to provoke the patience of the medical profession. It is known that American troops in this country have been forbidden to drink any milk except from T.T. herds and then pasteurized. This ought to be a sufficient comment on the whole unsatisfactory position. A clean-up of our milk supply as an early gesture by the new Minister of Health would certainly help him in the goodwill of the profession for his fresh negotiations.

SPECIAL DISABILITIES

The blind and the deaf have reason to hope that some of the amazing scientific discoveries and developments of the war may help them in their special troubles. Certainly if "radar" can guide airships in the dark and battleships in fog, cannot it help the blind to get about safely? A Sensory Devices for the Blind Committee has been set up by the authorities of St. Dunstans—our great organization for blind service-men—and it is already at work seeking how the blind may be guided, how a book may be read aloud by a machine and other important matters.

For the deaf also there is hope of more assistance. A new clinic has been established at the National Hospital, Queen Square, to investigate and treat all forms of deafness except those due to otorrhœa. A special feature of the work will be the testing of hearing-aids in close co-operation with a special committee of the Medical Research Council which is dealing with this subject.

ALAN MONCRIEFF.

London, September, 1945.

Canadian Medical War Services

MEDICAL OFFICERS APPOINTED TO THE R.C.A.M.C.—ACTIVE FORCE

JULY, 1945

(Previous sections appeared in the issues of February, March, May, July, September, November and December 1943, in each issue for 1944 except April and September, and in January, March, April, May, June and July, 1945.)

SECTION LII

Name *Address*	*Date of appointment*
Cole, R. H., Ottawa, Ont.	12-6-45
Couves, C. M., Lang, Sask.	15-6-45
Dick, C. J. W., Abernethy, Sask.	12-6-45
Goodman, W. S., Baldur, Man.	15-6-45
Herriot, E. M., Winnipeg, Man.	15-6-45
Kay, S. K., Winnipeg, Man.	15-6-45
Kaufman, P. M., Kitchener, Ont.	19-5-45
Kunstler, W. E., Montreal	16-4-45
Lehmann, M. J., Winnipeg, Man.	15-6-45
Meissner, G. F., London, Ont.	1-6-45
Muir, D. M., Shelbourne, N.S.	4-6-45
MacDonald, C. E., Assiniboia, Sask.	15-6-45
MacLean, N. B., Winnipeg, Man.	15-6-45
Pickering, N. A., Winnipeg, Man.	15-6-45
Ritchie, W. G. D., Dauphin, Man.	15-6-45
Rodin, M., Winnipeg, Man.	15-6-45
Roe, B. V., Winnipeg, Man.	15-6-45
Rubin, L., Winnipeg, Man.	15-6-45
Sheer, W. T., Winnipeg, Man.	15-6-45
Sussman, A. H., Arthur, Ont.	19-5-45
Wiebe, J. H., Winnipeg, Man.	15-6-45
Wilt, J. C., Stelcam, Sask.	15-6-45

MEDICAL OFFICERS STRUCK OFF STRENGTH OF THE R.C.A.M.C.—ACTIVE FORCE JULY, 1945

SECTION LIII

Name	*Address*	*Date struck off strength*
Archibald, E. W.,	Montreal	7-5-45
Botterell, E.,	Toronto	16-5-45
Carleton, M.,	Winnipeg	15-6-45
Clendinnen, I. C.,	Hamilton, Ont.	4-7-45
Colman, H.,	Prince Albert, Sask.	12-5-45
Cooper, R. H.,	Winnipeg	28-6-45
Fine, H.,	Toronto	11-6-45
Greenberg, C.,	Irma, Alta.	29-6-45
Kay, R. B.,	Toronto	29-6-45
Lebbetter, T. A.,	Yarmouth, N.S.	19-6-45
McCaffrey, J. A.,	Vancouver	4-7-45
McDougal, A. J.,	Abernethy, Sask.	27-6-45
McKerracher, D. G.,	Brockville, Ont.	27-6-45
MacNeill, A. L. H.,	Shaunavon, Sask.	26-7-45
Medovy, H.,	Winnipeg	25-6-45
Roy, A.,	St. Michel de Squatec, Que.	21-6-45
Seguin, G. A.,	Montreal	18-6-45
Tanner, A. R.,	Punnichy, Sask.	9-7-45
Urquhart, A.,	Preston, Ont.	26-6-45
White, E. P.,	Kingston, Ont.	6-7-45

MEDICAL OFFICERS RETURNED TO CANADA—JULY, 1945

SECTION LIV

Brig. Playfair, C. H.
Col. Gaboury, P. C.
Col. Gossage, C. D.
Col. Richardson, R. W.
Lt.-Col. Campbell, D.
Lt.-Col. Chute, A. L.
Lt.-Col. Coleman, J. U.
Lt.-Col. Corrigan, C. E.
Lt.-Col. Elkington, E. H. W.
Lt.-Col. Elliott, M. R.
Lt.-Col. Gibson, T. C.
Lt.-Col. Gosselin, J.
Lt.-Col. Halpenny, G. W.
Lt.-Col. Kerr, R. B.
Lt.-Col. Janes, E. C.
Lt.-Col. Merritt, J. W.
Lt.-Col. Norman, H. R. C.
Lt.-Col. Oille, W. A.
Lt.-Col. Petrie, J. G.
Lt.-Col. Ross, E. F.
Lt.-Col. Schoemperlen, C. B.
Lt.-Col. Shipp, F. L.
Lt.-Col. Sturdy, J. H.
A/Lt.-Col. Anderson, J. L. M.
A/Lt.-Col. Barclay, L. T.
A/Lt.-Col. Jose, J. G.
A/Lt.-Col. MacMillan, J. A.
A/Lt.-Col. Potter, R. T.
A/Lt.-Col. Shaw, A. G.
A/Lt.-Col. Squires, A. H.
Major Andrew, J. E.
Major Armstrong, A. R.
Major Bensley, E.
Major Benson, R. A.
Major Boxer, L.
Major Boyden, R. W.
Major Brown, M. M.
Major Brown, R. E.
Major Bruser, M.
Major Campbell, J. M.
Major Coddington, R. D.
Major Cohen, W.
Major Conn, R. S.
Major Costin, P. A.
Major Cragg, B. H.
Major Dancey, T. E.
Major Duffy, J. C.
Major Eaton, R. B.
Major Evans, A. M.
Major Fahrni, B. M.
Major Fairfield, G. C.
Major Fowler, J. L. A.
Major Frank, H. F.
Major Frost, A. C. G.
Major Gislason, H. E.
Major Glass, W. E.
Major Gray, C. C.
Major Hair, H. C.
Major Hamilton, J. D.
Major Jackson, B. A.
Major Kelly, G. C.
Major Large, G. C.
Major Logan, H. L.
Major MacDougall, J. T.
Major Malcolmson, P. H.
Major Maley, S. C.
Major Malone, G. M.
Major Murphy, G. H.
Major Miller, B. C.
Major Mustard, W. T.
Major McCrimmon, D. R.
Major McCutcheon, J. E.
Major McKay, C. O.
Major McManus, J. F. A.
Major Nichol, J. E.
Major Quehl, E.
Major Roy, T. E.
Major Ryan, P. A.
Major Scott-Moncrieff, R.
Major Schroeder, F. W.
Major Slack, W. R. I.
Major Smith, G. F.
Major Spence, P. M.
Major Stevenson, R. H.
Major Stoker, G. L.
Major Taylor, R. M.
Major Tilley, J. V.
Major Tweddell, T. N.
Major Wainwright, G. A.
Major Walters, C. H. A.
Major Wells, J. P.
Major Williams, H. I.
Major Wyatt, J. P.
A/Major Carette, L.
A/Major Carroll, J. J.
A/Major Cleghorn, R. A.
A/Major Crosby, C. H.
A/Major Fleming, J. M.
A/Major Foster, H. L.
A/Major Hart, R. G.
A/Major MacLean, H. M.
A/Major O'Neill, W. F. H.
A/Major Walters, J. A.
A/Major Weaver, M. A.
A/Major Williams, C. D. G.
A/Major Young, S.
Capt. Anderson, J. R.
Capt. Anderson, J. J.
Capt. Bethune, R. W. M.
Capt. Brokovski, T. W.
Capt. Brunton, L.
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Capt. Cloutier, E.
Capt. Cockcroft, W. H.
Capt. Croome, R. R. M.
Capt. Dawson, H. S.
Capt. Evans, C. C.
Capt. Farrell, H. S.
Capt. Feindel, J. R.
Capt. Fitch, M.
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Capt. Harrison, R. C.
Capt. Hayward, A. P.
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Capt. Inglis, W. A. N.
Capt. Jackson, H. B.
Capt. Katz, M.
Capt. Kickham, L. A.
Capt. Kussner, J.
Capt. Lavers, G. D.
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Capt. Lefebvre, J. F. A.
Capt. Levine, B. P.
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Capt. MacIntosh, R. A.
Capt. MacKenzie, W. F.
Capt. MacLennan, A. H.
Capt. MacLeod, J. A.
Capt. MacLeod, L. A.
Capt. Maunsell, D. B.
Capt. M'Gonigle, A. C.
Capt. Midgley, G. H.
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Capt. Mutch, J. F.
Capt. McFetridge, J. G.
Capt. Oatway, R. D.
Capt. O'Neill, J.
Capt. Orchard, C. B.
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Capt. Robinson, C. E. G.
Capt. Rosenberg, B. L.
Capt. Ross, H. M.
Capt. Roy, J.
Capt. Scratch, N. W.
Capt. Shepherd, G. H.
Capt. Slater, H. M.
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Capt. Templeton, D. W.
Capt. Van Horne, J. R.
Capt. Wilson, D. R.

Abstracts from Current Literature

Medicine

Present Status of Chemotherapy in Tuberculosis. Hinshaw, H. C., *et al.*: *Ann. Int. Med.*, **22**: 696, 1945.

Several drugs of the sulfone series have demonstrated a striking ability to arrest tuberculosis experimentally induced in guinea pigs. The tubercle bacillus must be added to the long list of organisms amenable, at least to some extent, to the chemotherapeutic approach. Three substances, promin, diasone, and promizole, have been subjected to clinical trials with mildly encouraging, but not conclusive results. Promizole has the distinct advantage of low toxicity for man, but its clinical efficacy has not been adequately demonstrated at this time.

It now appears certain that none of the drugs available for chemotherapy of tuberculosis has any clinical therapeutic effect comparable to the prompt and striking results commonly observed when sulfonamide drugs and penicillin are utilized in treatment of acute diseases. It is not known whether the fact that results with tuberculosis are less striking is due (1) to peculiarities of the tubercle bacillus; (2) to the unusual tissue responses in tuberculosis; or (3) more probably to the limited chemotherapeutic properties of drugs studied thus far.

Appraisal of chemotherapy in clinical tuberculosis must await the performance of adequately controlled clinical studies or the development of a remedy so powerful that results are immediately obvious. If a chemotherapeutic agent of practical application becomes available, its existence should be announced to the medical profession through proper professional channels. In the meantime, physicians should advise their patients to accept conventional forms of treatment, especially sanatorium care and collapse therapy, the value of which has been well established.

S. R. TOWNSEND

Clinical Action of Penicillin on the Uterus. Leavitt, H. M.: *J. Ven. Dis. Information*, **26**: 150, 1945.

The possibility that penicillin may have effects on the uterus similar to, but less intense than, those of ergot, also a mould product, is suggested by a review of records of pregnant women treated with penicillin at the New Mexico Intensive Treatment Centre.

Of 21 pregnant women treated for syphilis or gonorrhœa with penicillin, 8 manifested symptoms of uterine activity — cramps or bleeding or both. Of the 8 patients showing uterine symptoms, 2 had complete abortions immediately following the use of penicillin.

Of the 8 cases in which symptoms occurred, 7 were treated with the same lot of penicillin; 4 other pregnant patients treated with penicillin of the same lot manifested no unusual symptoms. Of 10 pregnant patients treated with penicillin made by 3 other manufacturers, only one showed symptoms. This may suggest that the observed action on the uterus may have been due to an impurity and not to the penicillin itself. Another group of physicians previously had reported 2 cases of threatened abortion following penicillin therapy for syphilis in pregnant women; they interpreted the reaction as a form of therapeutic shock rather than as the result of specific action of penicillin.

Several medical officers in charge of various rapid treatment centres have commented informally on the effect of penicillin in inducing premature menstruation or in prolonging menstruation already started. Effects of penicillin on menstruation have been observed repeatedly at the New Mexico centre. Some patients with a history of delayed menstruation promptly began to bleed soon after administration of penicillin. Others bled more profusely or for longer periods of time than normal, and some bled within a week after having completed previous menstruation. A rapid survey of the records of all mature female patients of menstrual age treated with penicillin at the New Mexico centre showed that 17 of 206 patients menstruated during the 24-hour period immediately following beginning of penicillin therapy; this was more than twice the 7.4 who might be expected to menstruate during any given 24-hour period. In a control survey of 253 mature female patients of menstrual age treated by methods not including penicillin only 7 women menstruated during the first 24-hour period following the beginning of treatment.

Ligation of the Inferior Vena Cava in the Prevention and Treatment of Pulmonary Embolism. O'Neil, E. E.: *New England J. Med.*, **232**: 641, 1945.

Venous ligation in the treatment and prevention of pulmonary embolism is a generally accepted surgical procedure. The common sites for ligation are the superficial femoral, the common femoral, and in a few cases, the external and common iliac veins. In the majority of cases such ligation is adequate in preventing the further extension of thrombosis and the danger of embolism. In rare cases, even after the bilateral ligation of such veins, embolism does occur since the thrombotic process is located in such situations as the prostatic or uterine venous plexuses.

There are two distinct indications for ligation of the inferior vena cava, first, when phlebothrombosis is present in both lower extremities and has extended to or above the inguinal ligament, and second, when pulmonary embolism has occurred from an unknown source.

The elective exposure and ligation of the lower vena cava is not technically difficult. Clinically the immediate and remote postoperative effects of such ligation are satisfactory. In eight cases only minimal discomfort was experienced by the patients, such as heaviness, numbness and moderate swelling of the legs. Œdema is not so frequent or so pronounced as after division of the femoral vein and usually clears up with the passage of time.

Collateral venous pathways and technique of operation are discussed in detail by the author. The point is stressed that, in cases where the site of venous thrombosis is not obvious, the highest possible ligation compatible with adequate venous return carries the best assurance of safety for the patient.

NORMAN S. SKINNER

Familial Cortical Cerebellar Atrophy. Hall, B., Noad, K. B. and Latham, O.: *Med. J. Australia*, **32**: 101, 1945.

These authors report the occurrence of this hereditary disease, characterized by disturbance of gait, and of speech, also marked ataxia in the descendants of a German settler and his wife. The original settler, four of his five children, and six of his eleven grandchildren showed the disease. In one instance there was a question of skipping a generation, since the one unaffected child in the second generation was thought to have a daughter with suggestive symptoms. In the second generation the average age of onset was in the 50's, while in the third generation it was in the 40's. There were 17 members in the fourth generation, 12 of them descended from affected parents, but all were too young yet to have developed the symptoms, even if they had inherited the disease. It did not shorten life, as most of the patients lived to old age. In the one autopsy performed, the chief lesion was widespread atrophy of the Purkinje cells in the cerebellum.

MADGE THURLOW MACKLIN

Surgery

Osseous, Cartilaginous and Mixed Tumours of the Human Breast. Rottino, A. and Willson, K.: *Arch. Surg.*, **50:** 184, 1945.

The authors have made a review of the literature on this subject. These rare tumours are characterized collectively by the presence of bone, cartilage, fibrous tissue and pleomorphic cells and depending on whether these elements are found alone or in combination. The tumours have been reported as chondroma, osteochondroma, chondrosarcoma, osteochondrosarcoma, osteosarcoma, osteoid sarcoma, giant cell sarcoma, myeloid sarcoma, mixed tumour, osteoclastoma and teratoma.

They conclude that "these tumours are essentially malignant. Long standing fibrodenoma is in many cases the parent growth from which they arise. The osteoid and bone elements probably arise by metaplasia from myelinized collagen. The mode of origin of cartilage is less clear. The nature of the cellular component has evoked divergent opinions, some authors saying that it is carcinomatous and others that it is sarcomatous." G. B. LEARMONTH

The Surgical Treatment of Carcinoma of the Rectum. Hayden, E. P.: *New England J. Med.*, **233:** 81, 1945.

Carcinoma of the rectum and sigmoid demands radical surgery whenever possible. Of 217 cases explored by the author only 19 presented such extensive growth as to preclude removal.

The ideal operative procedure is a one stage abdominoperineal resection performed under pontocaine spinal anæsthesia, after a proper preoperative preparation of 3 to 5 days in hospital. The growth should be removed even if the outlook for cure is not good, regardless of the age of the patient, if there is a reasonable likelihood of survival of the operation.

Of the entire series 26 died in hospital (13%). Of the 198 cases resected 75 died later, 12 of unrelated causes, and 96 are still alive. Of the 98 patients operated on over five years ago 32 (33%) have survived without evidence of disease for a period of five to fourteen years. NORMAN S. SKINNER

Traitement médical ou chirurgical dans les ulcères. Gutmann, R.-A.: *Presse Méd.*, **21:** 265, 1945.

L'auteur expose le point de vue médical en regard du traitement chirurgical des ulcères. A son avis, la discrimination suivante s'impose: "il y a des lésions qu'il *faut* opérer; il en est qu'on *peut* opérer; il en est où l'intervention est tout à fait *inutile.*" Sa thèse est dictée par la distinction qu'il fait entre l'ulcère duodénal et l'ulcère gastrique du point de vue de l'indication d'une thérapeutique médicale ou chirurgicale.

L'ulcère duodénal commande généralement un traitement médical suivi, du moins tant qu'il ne produit qu'une gêne inflammatoire et non organique de l'évacuation. L'un des arguments en faveur de l'intervention est la possibilité de l'hémorragie et de la perforation. Pourtant, d'après l'auteur les hémorragies habituelles de l'ulcère duodénal radiologiquement peu profond sont plus impressionnantes que graves. Alors que, au contraire, les grandes hémorragies des vieux ulcères et les "formes hémorragiques" constituent une indication opératoire formelle. Quant à la perforation, l'auteur mentionne spécialement la perforation d'emblée, survenant chez un malade qui n'a jamais souffert, et contre laquelle le médecin est préventivement désarmé.

L'ulcère gastrique éveille l'idée de cancer, d'où une politique opératoire que l'auteur considère comme très souvent abusive. Il réclame donc un contrôle radiologique et clinique plus sérieux avant d'opérer n'importe quel ulcère gastrique non traité médicalement au préalable. "Par contre", écrit-il, "si la niche gastrique ne disparaît pas (et même si le malade cesse de souffrir) cette persistance est un signal d'alarme et il faut opérer." L'auteur recommande la mise en action du "test thérapeutique", ou traitements de choc à base de protéines intraveineuses, par exemple, comme moyen de juger rapidement de la bénignité ou de la malignité d'une lésion gastrique. Enfin, il déconseille nettement, sauf urgence, d'opérer un ulcéreux en poussée afin d'éviter les complications post-opératoires, locales ou générales. PIERRE SMITH

Pancreaticoduodenectomy for Islet Carcinoma. "Pancréatico-duodénectomie pour un cancer des ilôts de Langerhans. Whipple, A. O.: *Ann. Surg.*, **121:** 847, 1945.

L'auteur expose dans le détail un cas dont le diagnostic pré-opératoire fut: cancer de l'antre; le diagnostic post-opératoire: cancer de la tête du pancréas, et qui subit le traitement radical suivant: gastrectomie partielle; duodénectomie totale; excision de la tête et d'une partie du corps du pancréas; gastro-entérostomie antérieure termino-latérale; et cholédocho-entérostomie; le tout pratiqué en un seul temps. Les suites opératoires furent heureuse et l'opérée (une femme de 53 ans) n'a pas encore manifesté de tendances à l'hyperinsulinisme ni à l'hypoglycémie.

Après une longue description de la technique employée, l'auteur la préconise de préférence à celle en deux temps parce qu'elle permet d'éviter deux anesthésies et deux interventions majeures ainsi que la libération d'adhérences massives éventuelles dans le second temps qui est aussi le plus difficile. La rachianesthésie continue, accompagnée de transfusion rend l'opération en un temps plus sûre que celle en deux temps, et le danger d'hémorragie est contrôlé par une thérapeutique pré-opératoire à base de vitamines K.

D'après l'auteur le procédé de choix dans les cas de cancer de la tête du pancréas est l'intervention en un temps consistant désormais dans la cholédocho-jéjunostomie avec implantation du canal pancréatique dans le jéjunum. PIERRE SMITH

Plastic Surgery and Burns

The Nutrition of Patients with Thermal Burns. Levenson, S. M., Davidson, C. S., Lund, C. C. and and Taylor, F. H. L.: *Surg., Gyn. & Obst.*, **80:** 449, 1945.

Increased use of plasma and the re-emphasis of the proper use of electrolyte solutions has resulted in many severely burned patients surviving the early shock phase. The problem of malnutrition following burns is therefore present in an increasing number of patients. Observations on 32 patients studied between November, 1942 and August, 1943 are reported.

Patients were urged to take a solid diet as soon as possible. The ordinary diet was supplemented with foods rich in protein and fat. If oral intake was insufficient feeding was done by stomach tube, intravenously, or intrasternally.

The principal demand of the burned patient is for nitrogen. This increased demand is the result of excessive loss of nitrogen into the urine during the first few weeks, and later large losses of nitrogenous material from the burned surface. It is related to the severity of the burn, particularly of third degree injury. Loss of nitrogenous material continues until the injured area is covered with skin. Nitrogen loss in a second degree burn ceases in a few days. Once sloughing of dead tissue starts loss of nitrogen may be considerable. This loss is evidenced by continued loss of weight, fall in plasma protein, and œdema. It may occur in patients who are in apparent positive nitrogen balance as regards nitrogen intake and its output in the urine.

Severely burned patients may require five times the normal intake of nitrogen. The diet must contain adequate amounts of protein, sufficient calories, fats, carbohydrates, minerals, waters, and accessory food substances.

Food is best taken by mouth. Caloric and protein requirements may make the diet bulky and unpalat-

able. Tube feeding should be begun cautiously and the amount increased gradually. Hydrolysates intravenously cause pain and frequently sclerosis of the vein. Nausea and vomiting were also observed during intravenous administration of casein hydrolysates when given faster than 0.5 grams per minute. No study of vitamin requirements was made. Nearly all the patients were given five times the optimum doses of vitamins A, D, ascorbic acid, thiamin, riboflavin and niacin. Fifty milligrams of pyridoxine and capantothenate plus yeast and crude liver extract were given daily. Pre-injury state of nutrition is important. The poorly nourished individual is not equipped to withstand a prolonged period of negative balance; also he is more difficult to feed. Excessive fat should be avoided, due to the possibility of liver disease. There is considerable evidence that adequate nutrition is important in the prevention and treatment of liver disease. STUART D. GORDON

Obstetrics and Gynæcology

Post Menopausal Pruritus Vulvæ. Cinberg, B. L.: *J. Obst. & Gyn.*, **49**: 647, 1945.

The theory is advanced that most cases of post menopausal pruritus vulvæ are basically due to a local atrophy of the skin. This permits an invasion and infection of the derma by the usual pathogenic skin organisms, which are always present in that region. The resulting inflammation affects the nerve terminations in the papillæ of the derma and produces the itching. The microscopic and macroscopic pictures are largely determined by the individual's defence reactions. The same stimulus which will result in lichenification in one person will cause leucoplakia in another.

The best method of obtaining relief is to protect the skin from further irritation by the constant application of a bland ointment for at least three months.

An androgenic ointment should be used locally in those cases which exhibit severe vulval atrophy.

The successful treatment is reported of fourteen cases of severe post menopausal pruritus vulvæ in which pre-therapy and post-therapy biopsies were obtained. Five of these patients had leucoplakia of the vulva.

ROSS MITCHELL

Necrosis of the Liver and Bilateral Massive Suprarenal Hæmorrhage in the Puerperium. Dodds, G. H.: *Brit. M. J.*, **1**: 769, 1945.

A 34-year old primigravida, 38 weeks' pregnant was admitted to hospital with mild toxæmia. The toxæmia had been recognized about two weeks earlier and she had been advised to rest at home and to avoid meat and fish. She was delivered spontaneously of a 7¼ lb. living male child under self-administered trichlorethylene. Two days after delivery she had slight icterus, was lethargic and complained of frontal headache. A tentative diagnosis of acute yellow atrophy was made. On the third day she became comatose but improved considerably later in the day. That evening she complained of epigastric pain. Next day she was drowsy and complained of pain under the right costal margin. She suddenly became worse and died about ninety-five hours after delivery.

Autopsy revealed massive necrosis of the liver and hæmorrhage in both suprarenals which were three or four times the normal size.

Three possible factors contributing to this result were (1) the toxæmia; (2) the low-protein diet; (3) the use of trichlorethylene. ROSS MITCHELL

Hypoplasia of Uterus with Special Reference to Spasmodic Dysmenorrhœa. Jeffcoate, T. N. A.: *J. Obst. & Gyn. Brit. Emp.*, **52**: 97, 1945.

The pain of spasmodic dysmenorrhœa is related in some way to contractions of the uterus. The difference between painful and painless contractions lies in their character rather than their strength. The particular pattern of uterine motility causing pain during menstruation is unknown but the view which supposes inco-ordination of different areas of the uterus, or disturbed polarity of the uterus, has still to be disproved. The theory which supposes uterine hypoplasia as the cause of the abnormal uterine contractions, and the evidence on which it is based are critically examined in the light of what is known about the development of the uterus. An analysis of the histories of 829 patients suffering from spasmodic dysmenorrhœa shows that not more than 27 patients had definite signs of uterine hypoplasia. The age of the menarche was usually within normal limits. Scanty and infrequent menstruation was exceptional and most women had a regular cycle. Endometrial studies in 111 cases showed, with 2 exceptions, that the histological phase agreed with the time in the menstrual cycle. Painful menstruation is usually ovular in type; 457 patients had some minor malformation or malposition of the uterus, but these faults are not accepted as an indication of hypoplasia. The existence of an interval between the menarche and the onset of dysmenorrhœa in a large percentage of cases is confirmed. This in itself is evidence against hypoplasia theory. An analysis of a second series of 86 patients, all of whom had a hypoplastic or atrophic uterus, shows that of the 28 women who were menstruating only one had dysmenorrhœa of an incapacitating degree. The effect of œstrogen on a hypoplastic uterus depends on the ability of the organ to respond.

P. J. KEARNS

The Uncomplicated Primigravid Breech. Greig, D. S.: *J. Obst. & Gyn. Brit. Emp.*, **52**: 122, 1945.

Sixty cases of vaginal delivery of the uncomplicated primigravid breech were presented. Delivery was accomplished with one fetal loss. The last 58 cases were delivered without any fetal loss. The wide use of Cæsarean section for the uncomplicated primigravid breech is deprecated. It is suggested that only two distinctly separate techniques are permissible. (*a*) Deliberate breech extraction under full anæsthesia and (*b*) spontaneous breech delivery. It is maintained that the common assisted breech delivery with induction of anæsthesia gradually brought in during delivery falls between the two methods and exhibits the virtues of neither. The writer believes that fully 90% of primigravid breech deliveries can be spontaneous. The fetal death was a stillbirth that died of cerebral damage with depressed fracture of the posterior parietal bone. One case appeared to have some cerebral irritation.

P. J. KEARNS

Orthopædics

The Results of Epiphyseodesis and Femoral Shortening in Relation to Equalization of Limb Length. Straub, L. R., Thompson, T. C. and Wilson, P. D.: *J. Bone & Joint Surg.*, **27**: 254, 1945.

Owing to lack of a satisfactory method of predicting the rate of growth of bone only 20% of the results of 89 cases were classed as excellent, although in 50% of the cases a final end result with a discrepancy of 2 centimetres or less was obtained. It is generally a mistake to perform epiphyseodesis for the correction of shortening in a female after the age of eleven years, and in a male after the age of 12½ years, although there are exceptions to this rule. The operation is of particular value in young patients where the discrepancy is increasing rapidly and a considerable difference in the normal length of the two extremities would be normally expected. After growth has been completed femoral shortening is an exact procedure with few complications and gives a maximum correction of three inches. GUY H. FISK

Multiple Rib Fractures Treated with a Drinker Respirator. Hagen, K.: *J. Bone & Joint Surg.*, **27**: 330, 1945.

A case of a man with fractures of the second to eleventh ribs on the right side and second to twelfth

ribs on the left side is described. Within twenty-four hours of the injury the man was placed in a Drinker respirator for ten days after which he was gradually removed for increasing periods of time each day, until three weeks after the accident he was able to breathe without the aid of the respirator. The author considers that in the "stove-in chest" type of injury the use of a respirator should be given consideration. GUY H. FISK

Radiology

Roentgen Observations on Primary Atypical Pneumonia. Jamison, H. W.: *Radiology*, **45**: 15, 1945.

Of a series of approximately 1,500 pneumonia patients admitted to the A.A.F. Regional Station Hospital of the Santa Ana Army Air Base over a period of two years, about 1,200 or 80% have been clinically classified as primary atypical pneumonia. Clinically, one of the most striking features of the disease is the relatively mild symptomatic course as compared with the amount of lung consolidation shown on corresponding chest films. Many ambulatory patients are discovered to have the disease by routine screening films. Prolonged convalescent care is required in many cases because of persistent post-pneumonic asthenia. A normal or depressed white blood count and absence of pathogenic organisms in sputum cultures are among the most significant of laboratory findings.

The radiographically demonstrated pulmonary infiltrations fall roughly into two main groups: one, a comparatively mild mediobasal peribronchial type of infiltration; the other, a more or less confluent type of pneumonic consolidation. Unusual types may simulate adult reinfection tuberculosis, miliary tuberculosis, coccidioidomycosis, lobar pneumonia, and other diseases. The majority of pulmonary consolidations are localized to the middle or lower lung fields. They are slow in resolution, usually passing through an intermediate peribronchial stage and occasionally shifting from one lung area to another. There are few complications, and a fatal termination is rare.

In the single death in this series, interstitial inflammatory changes in the involved lung tissues were outstanding, and degenerative changes in the bronchial and alveolar walls were a prominent feature.

R. C. BURR

Antral Gastritis: Roentgenologic and Gastroscopic Findings. Vaughan, W. W.: *Radiology*, **44**: 531, 1945.

The gross pathological findings in antral gastritis may be divided into three groups: (1) An acute œdematous process with involvement primarily of the mucosa and submucosa. (2) Ulceration of the mucosa with involvement of the muscularis submucosa. (3) A chronic inflammatory process with hypertrophy of the mucosa and round-cell infiltration of the muscularis submucosa extending down to the serosa.

The roentgen findings vary all the way from a temporary and persistent spasm of the antrum, with impaired, irregular, and ineffective peristaltic waves producing abnormal antral systole, to a constant filling defect such as may be seen in an antral or prepyloric carcinoma. If the lumen of the antrum is still patent so that a small amount of barium can be forced through, ulceration can frequently be demonstrated.

The gastroscopic picture in antral gastritis depends entirely upon which one of the three pathological groups is represented by the case. Group 1 shows considerable reddening of the mucous membrane which is extremely œdematous and closely simulates the oral mucosa following injection with novocaine. The antral channel may be completely occluded. Unless the pyloric sphincter can be well visualized one can never be sure whether or not there is an underlying ulcer. Ulceration, however, is not common in this group. Group 2 shows a red, rather œdematous mucosa. There are a number of superficial ulcerations from which bleeding is frequently seen through the gastroscope. There is usually a great abundance of mucopurulent material. In Group 3 the gastric mucosa has a cobblestone appearance and is frequently rather pallid. The mucosal folds are hypertrophied and appear beaded or wart-like. Ulcerations may occur but are infrequent. The normal shortening of the antrum associated with peristaltic waves is absent. The incisura angularis and pyloric sphincter appear to be fixed in position.

The prognosis in antral gastritis is apparently quite good, although gastric resection may be necessary. Every case of antral gastritis possibly has malignant potentialities. By correlating our roentgenological and gastroscopical findings with the clinical course, we can more accurately evaluate the prognosis of the disease.

R. C. BURR

Hygiene and Public Health

Reactions Following Mass Administration of Sulfadiazine. Lee, R. V.: *J. Am. M. Ass.*, **126**: 630, 1944.

Reactions following mass administration of sulfadiazine to 25,000 persons are recorded. The sulfadiazine was given as a prophylactic against pneumococcic, staphylococcic and meningococcic infections. Each individual was given a single dose of 2 grams.

One hundred and twenty-eight reactions (0.51%) are recorded. There may have been others which were not reported. These reactions have been classified as follows:

Fifteen patients: mild cutaneous reactions consisting of generalized erythematous or follicular rash of short duration. One hundred patients: mild general reactions consisting of malaise, nausea, diarrhœa, vomiting and faintness. It is not certain that all these reactions were due to the sulfadiazine. Four patients: severe cutaneous reactions. Two showed exfoliative dermatitis, 2 œdema. Six patients: severe generalized reactions characterized by malaise, low fever and mental confusion. Two or 3 patients had some œdema and dermatitis. Symptoms clearly in a few days. Three patients: serious general reactions characterized by malaise, high fever, œdema and unconsciousness.

All cases recovered. Many of the cases had had trouble following administration of the drug previously and had failed to take the warning. FRANK G. PEDLEY

Enquête sur l'Etat de Nutrition de la Population Scolaire de Clermont-Ferrand de 1941 à 1944. Rohmer, P., Sacrez, R., Rohmer, J. A. et Beyer, P.: Address, Academie de Médecine de Paris, February 20, 1945.

This report comes from the Clinique Infantile de Strasbourg which had moved to Clermont-Ferrand. In Clermont-Ferrand, a clinic known as "Consultation Régionale de Maladies par Sous-alimentation et par Carence" was established in 1941. Physicians from the four neighbouring departments were invited to send persons who appeared to be suffering from deficiency diseases to the clinic, but as no cases were referred, it was decided to undertake an independent investigation to determine the nutritional status of local children. The schools were used for this investigation. Arrangements were made whereby all children were to be weighed and measured regularly. Children who were discovered to be under weight or under size and those whom the teachers thought to be poorly nourished were referred to the clinic for a thorough examination. One hundred children aged 10 to 12 years, chosen at random, were also given a complete examination.

The *first period* of the study refers to the year 1941-42. Nine thousand children (3 to 14 years) were studied, of which 2,158 were followed regularly. Twenty-five children showed a loss of weight during the year. All these 25 children came from poor families and nearly all had been sick during the year. In the examination of these 25, 13 were found to be in good physical condition and 12 in poor physical condition; 4 gave positive tuberculin reaction without evidence of active tuberculosis; blood vitamin A was normal in all, blood vitamin C normal in 11 and low in 14; blood

protein was normal in 23 and slightly low in 2. All showed normal blood pressure.

The heights and weights of the children who had not lost weight were compared with the tables of Puquet and Kornfeld and it was found that above the age of 10 years, the weights of the children were in general heavier than those indicated in the tables, below 10 years of age, the weights were somewhat less. At the expiration of 12 months, 60% of the children had gained weight normally, 40% showed a gain in weight below normal. Growth in height was normal in 42% and retarded in 58%.

During this same year (1941-42), 100 children (aged 10 to 12) selected at random were given a complete examination with the following results:

General condition:	
Considered normal	69
Considered in poor health	31
Anæmia:	
Children showed no anæmia	84
Showed red blood cells 3,500,000 to 4,000,000 and hæmoglobin 65 to 70%	16
Hypertension:	
Showed slight hypertension (maximum 145 mm.)	32
Vitamin A:	
Showed normal blood levels	81
Showed slightly low levels	19
Vitamin C:	
Showed normal blood levels	95
Showed slightly low levels	5
Blood protein:	
Showed levels between 52 and 64 gm. per litre	36

The *second period* refers to the year 1943-44: 6,016 children were involved in this study, but all but 2,106 left the city before the end of the year. At the beginning of the study, the weights of the children corresponded fairly well with the tables. The heights were slightly below average. Of the 2,106 children followed from December, 1943 to June, 1944, 31.3% showed a normal gain in weight (contrast with 60% in 1941-42), 12.4% lost weight (contrast with 1% in 1941-42).

Sixty-seven children (aged 9 to 14 years) chosen at random were given a thorough clinical examination with the following results:

General condition: good	41
poor	26
Hyperkeratosis and dryness of skin	4
Gingivitis	16
Dental caries	17
Blood pressure above 120	20
Tuberculin reaction +	9
Red blood cells less than 4,000,000	16
Vitamin A below 280 γ (20 examinations)	5
Carotene below 500 γ (20 examinations)	5
Vitamin C below 2 mgm. (37 examinations)	8
Serum protein 60 to 65 gm. per litre (30 examinations)	4

The final conclusion of this article is as follows: "In general, it may be said that the child population of Clermont has suffered seriously from the long-term restrictions, but that the results at present have not been grave or irremedial."

Industrial Medicine

Industrial Canteens in Australia. An Experiment in Central Planning. Rouse, M. G.: *Industrial Welfare and Personnel Management*, **27**: 56, 1945.

The author describes the Australian experiment in industrial feeding, whereby the government established centralized control and complete standardization of the cafeteria service for all workers in war industries. The workers catered for were in government munition factories, in shipbuilding yards and naval establishments, on the waterfront and in the coal mines. This system was inaugurated to provide employees with nutritious meals at reasonable prices and to demonstrate the practicability of such a scheme.

Under the Food Services Branch the government planned, built and equipped the cafeterias, trained the key staff and managed the feeding programs. All wages of cafeteria staff in excess of 17½% and all transport costs in excess of 1% of sales were paid by the government. The head office and central administrative unit, was in Melbourne and the four area offices in Sydney, Melbourne, Adelaide and Brisbane, controlled the cafeterias in their particular sections.

The main object was the service of a hot meal, in twenty minutes on all three shifts at a cost which the worker could afford. A standard menu was: thick soup, a choice of three entrees, a choice of three salads, potatoes and two vegetables, a choice of three sweets, up to two slices of bread and butter, and tea or milk. The complete meal cost approximately 1s. 2d. The meal service was governed by nutritional principles and training schemes were organized for canteen managers and cooks. The workers were represented on the canteen advisory committees.

In addition to these cafeterias, the government also gave encouragement and complete technical advice and assistance to employers in private industry to establish cafeterias, not only as a war-time service but with a view to the post-war development of industrial feeding. The author is of the opinion that the works cafeteria is a means where nutrition education may be effected by example rather than by propaganda.

MARGARET H. WILTON

Obituaries

Dr. Boris P. Batanoff, well-known and greatly admired physician of Blaine Lake, died July 30 at his summer home near Lake Emerald.

Known throughout northern Saskatchewan for his untiring efforts and devotion to his profession, as well as for his active participation in community affairs, his death at the age of 56 is a loss which many of the citizens of his adopted land deeply feel.

Dr. Batanoff was born in 1889 at Limbursk, Russia. Graduating from the University of Kazan in 1914, he joined the army as a surgeon, and was sent to the Russo-Turkish front, from which he returned in 1917, suffering from malaria.

During the civil war, Dr. Batanoff and his wife, Dr. Maria Batanoff, were sent with a trainload of wounded soldiers to Ufa, Siberia. There he was drafted by the White Russian army of Admiral Kolchak, and as surgeon of a cavalry division travelled through all Siberia on horseback. In 1919 he was appointed senior surgeon of the Red Cross hospital train at Chita, Siberia, where his wife had been working during his absence. There they worked together until 1922, when their train was sent to Manchuria to aid Russian refugees.

In 1923 when the Red Cross organization was disbanded, Dr. Batanoff opened an office at Chang Chun, Manchuria, where he remained until 1925. For his work on the battlefields he received four decorations.

He came to Saskatchewan in 1925 and began practice in 1928.

There was not an organization or activity that Dr. Batanoff was not closely associated with at Blaine Lake. He was president of the Canadian Aid to Russia Fund, he organized the blood donors' and tuberculosis clinics, and he initiated the drive for the Blaine Lake Community Hall, built as a memorial to the dead of this war from that town. All this was apart from the tremendous energy he expended in his work as a medical man, attending his patients at all times, and often risking his life to do so.

He is survived by his widow, Dr. Maria Batanoff, and four children.

Dr. John Henry Richard Bond, a pioneer in radiology in western Canada died on August 22 at his residence in Winnipeg aged 86. Born in England, Dr. Bond graduated from Edinburgh University and practised at Auckland, N.Z., and in the United States before coming to Winnipeg in 1903. His wife, who had had a distinguished career in war nursing prior to her marriage, was the founder of the Children's Hospital, Winnipeg. Dr. Bond's practice was confined to x-ray. He retired from active practice about twenty years ago.

Dr. Alexander Cherry, of Lethbridge, passed away on August 4 at the age of 47. He graduated from Manitoba University in 1924 and practised in that Province for a year, when he came to Alberta. He successfully practised at Foremost for several years, then moved to Lethbridge. In 1939, he was elected District Representative on the Council, but resigned when he joined the Forces in 1941.

Dr. O. H. Duncombe died at his home in Waterford on August 1 in his 87th year.

Dr. Duncombe was a son of Dr. David Duncombe, a pioneer physician who practised from Ancaster to St. Thomas. Dr. David Duncombe invested heavily in farm lands in the early days, settling north of Waterford, moving to Waterford about the middle of the century. Dr. Duncombe attended school at Dundurn and Waterford and attended the first classes at the Ontario Agricultural College, Guelph. He later entered the Ontario Veterinary College from which he graduated in 1889 and practised in this district for more than 50 years.

Dr. Duncombe had been active in civic affairs, having served as councilor, twice as reeve of Waterford and was warden of Norfolk in 1919. He was a Liberal and a Baptist and had served on many of the boards of the Waterford church. He had been a member of the choir over 50 years, part of the time as leader. He was a charter member of the Waterford Lawn Bowling Club, organized 40 years ago.

He leaves his widow, Lula McMichael Duncombe, and a son, Raymond Duncombe, of Brantford.

Dr. Henry Hedden, died in Memphis, Tenn., on July 30, following a short illness. After his internship at the Saint John General Hospital he became superintendent of that institution in 1917, a position which he held for a period of four years, until his removal to Memphis, to accept the position of the Methodist Hospital. He was 54 years of age.

Dr. Hedden was born in Dunnville, Ontario. After graduating from Queen's University in 1916 he enlisted as a lieutenant in the Canadian Army Medical Corps.

In 1918 he received a Master in Surgery degree from Queen's, following which he took a course in roentgenology at the Post-Graduate Hospital in New York. In 1920 he married Freda Elizabeth Paterson in Saint John.

While superintendent of the General Hospital here he was also staff roentgenologist and was secretary of the board of commissioners for the hospital.

In Memphis, he was an active member of Madison Heights Methodist Church, where he was treasurer and a former chairman of the board of stewards. He was a delegate to two Methodist conferences, one in 1938 and the other in 1939.

He was a Mason and a Shriner. He was particularly interested in civic affairs in which boys were concerned.

Surviving besides his widow are three sons, all of Memphis.

Velyien Ewart Henderson, M.A., M.B., F.R.S.(Can.), F.R.C.P.[C.] died suddenly on August 6, 1945. He was on holiday at his summer cottage in Go Home Bay when he was stricken with coronary occlusion and died almost instantly.

Dr. Henderson was born in Cobourg, Ontario, in 1877, the son of Joseph and Louise Ewart Henderson. He attended Upper Canada College and graduated B.A. in Natural Science from the University of Toronto in 1899. In 1902 he obtained the degrees of Master of Arts and Bachelor of Medicine. The next year was spent in graduate study in the University of Pennsylvania. In 1903 he went abroad and studied for a year in Prague and Marburg. In 1905 he spent the summer vacation in study at the University of London, and in 1907 he worked in Graz. As an undergraduate he was a member of the track team and for many years he served on the Athletic Association of the University of Toronto.

His career as a teacher and investigator in the University of Toronto began in 1904 when he was made Lecturer in Pharmacology and Demonstrator in Physiology. He became Professor of Pharmacology in 1919 and a long list of publications from his department indicate the quality and interest of his work. The widely used anæsthetic agent, cyclopropane, has made his name famous the world over.

Dr. Henderson was chairman of the Canadian Committee of Pharmaceutical Standards from 1927 to 1943 and was also chairman of the Committees on Pharmacy in the Canadian and Ontario Medical Associations. Many valuable reports came from these committees, and the best of the government regulations regarding patent nostrums are based upon them. His services as Chairman of the Committee on Pharmacology of the C.M.A. began before 1922, and he served as member of council ever since the re-organization of that date. He was a past president of the Federation American Society of Experimental Biology and the Canadian Physiological Association and an honorary life member of the Canadian Pharmaceutical Association. He was also chairman of the Committee on Pharmaceutical Studies in the University of Toronto Senate. In 1944 he was awarded the Flavelle Medal by the Royal Society of Canada, of which he had been a Fellow for many years. Dr. Henderson was a Charter Fellow of the Academy of Medicine, Toronto. He gave a number of valuable contributions to it, and his interest in its work was unfailing.

In the war of 1914-1918 he served as captain in the University of Toronto C.O.T.C. and went overseas in 1916 as major in artillery.

Dr. Henderson is survived by his widow née Edith Van der Smissen and two sons, both of whom are overseas. His brother, Dr. Ernest Henderson, and two sisters also survive.

Nelles Boyd Laughton, B.A., M.D., M.Sc., Ph.D., died suddenly at his home in Trafalgar Township on July 15, 1945, at the age of 49 years. He graduated from the University of Western Ontario in 1933 and had been engaged in practice in Toronto since 1934. He had been a Fellow of the Academy of Medicine, Toronto, since 1934.

Dr. Narcisse Albert Laurendeau, died in St. Boniface Hospital on September 4, aged 61. Born in St. Boniface, he was educated in Provencher School and St. Boniface College. His medical education was obtained at Manitoba Medical School and Laval University where he graduated in 1909. He practised continuously in St. Boniface, which city he served as mayor for two years and coroner for fifteen years. Three daughters and two sons survive him.

Dr. Thomas Richard Little, aged 63, a graduate of Queen's University and a former member of the Faculty of Medicine teaching staff, died suddenly of a heart condition at his home in Ottawa on July 23.

Born in Kingston, he was the son of the late Mr. and Mrs. Thomas Joseph Little. Receiving his education here he studied medicine, at Queen's where he

specialized in pathology. In 1915 he graduated with an M.B. degree and in 1920 received the degrees of M.D., C.M. Following his graduation, he taught at the university until his career was interrupted during the first Great War when he volunteered for overseas duty. Attached to the Canadian Army Medical Corps, he served with the mobile laboratories in Cairo and Salonika, as a lieutenant-colonel.

After cessation of hostilities, Dr. Little resumed his duties at Queen's for a few years, leaving then for Ottawa to accept a position in the newly-opened Ottawa Civic Hospital. From 1926 until 1938 he was director of the Department of Pathology at that hospital. From that time on he had been engaged in private practice.

Dr. Little belonged to a number of organizations, some of which were the Ontario Pathological Society, the Canadian Medical Association, the Ontario Medical Association and the Ottawa Chirurgical Association. He was a member of the Presbyterian Church and also a member of the Masonic Order.

Dr. Little was well known in the sporting field, being a keen angling enthusiast. He was also an ardent student of nature and made several distinguished collections of Canadian flora during nature study journeys through the Canadian Rockies.

Surviving, in addition to his widow, the former Eleanor Daly (Kit) of Kingston, to whom he was married in Kingston 30 years ago, are one son, Thomas Vincent Little, staff photographer for *The Ottawa Journal*, and two brothers, Herbert Little, Halifax, N.S., and George Little, Kingston. Dr. Little was predeceased by his sister, Mrs. J. Fairburn, Toronto.

Dr. Arthur H. Mann, of Olds, died on July 26, at the age of 59. Born at Stittsville in 1889, he took his medical training in McGill University, where he graduated in 1915. He was a star player on the senior hockey team at the University. In 1916, he commenced to practice at Olds, where he continued until he died. In 1935, he was a candidate in the Provincial election, but was defeated when the Social Credit party swept the country. He was an active member of several fraternal orders.

Dr. Archibald McDonald, who for a period of 20 years acted as general surgeon among the Indians at Fort Smith, N.W.T., prior to which he practised his profession at Alexandria for 23 years, died at the Old Homestead, Glen Donald, near Cornwall on August 2.

Dr. McDonald, despite his 87 years, was smart and active until a couple of weeks before his death, when he suffered a severe heart attack, and was compelled to take to his bed.

He was born on the farm where he died, on July 3, 1858, a son of Alex. Allan Ban McDonald, who was born in Glengarry on January 13, 1810, and his wife, Catherine McGillis, also Canadian born. His grandparents came from Scotland and settled in Glengarry in 1700 and are buried at St. Raphael's.

As a boy, Dr. McDonald started his education in the home school at Glen Donald. Later he attended Williamstown public and high schools, Alexandria and Cornwall high schools, and played considerable lacrosse while at Alexandria. After serving his matriculation at Cornwall high school, he entered McGill University, Montreal, where he took up the study of medicine.

He graduated from McGill with the degree of M.D., C.M., with the spring class of 1887. He hung up his first "shingle" as a medical practitioner at Main and Elgin Streets, Alexandria and for 23 years from 1887 to 1910 he conducted an office there.

On April 28, 1910, Dr. McDonald left Ottawa for Edmonton, having been appointed medical superintendent at Fort Smith, under the Department of Indian Affairs, the appointment being made by Dr. Scott, superintendent general of Indian Affairs.

For 20 years Dr. McDonald ministered to the Indians and travelled thousands of miles, frequently going down the Slave and Mackenzie Rivers to Aklavik, using canoes in summer and dog teams in winter.

Dr. McDonald married Miss Annie Coleman, a native of Leeds, England, at Alexandria, on May 10, 1891. They had one son, Alexander Coleman McDonald, who met an untimely death while motoring from Montreal to his summer cottage at Knowlton, Que., on June 24, 1933. Dr. McDonald's wife died in Alexandria in 1902.

Dr. Dougall Stonewall Macdougall, who practised medicine in Russell, Ont., for over 50 years, died on August 24 following a lengthy illness. He was in his 83rd year.

Dr. Macdougall, who devoted most of his time to his practice, was interested in village affairs, and was often associated with community endeavours which proved progressive for Russell.

Born in Russell on May 3, 1863, he was the son of the late John Macdougall and Elizabeth McTavish. Dr. Macdougall received his primary education in the village school, and, following his graduation from McGill University, he settled in Russell 57 years ago.

Surviving are his widow, the former Ella Maude Cameron, whom he married in Buckingham 45 years ago, and a daughter, Dorothy, of Saginaw, Mich.

Dr. Henry Arthur McFarlen, formerly of 128 Martin Ave., Elmwood, Man., died on July 16, following a lingering illness.

Dr. McFarlen was born at Mount Forest, Ont., October 31, 1871, and came west to Regina in 1896. He took his high school education in the Saskatchewan capital, completing same at normal school there. For a comparatively brief period he taught school in Regina.

Then he took his B.A. degree at Wesley College, Winnipeg, and graduated in medicine in 1908. He immediately opened his first office in this district, on Nairn Ave., in the old horse-and-buggy days, and thus served the area as a family physician for a period of 35 years.

Dr. McFarlen was interested, in the earlier days, in the public life of the growing community, more especially in point of education, and served as a member of the Winnipeg school board for a period of about 15 years.

In the first World War he served with the Medical Corps overseas as captain, and upon his return took up residence at 128 Martin Ave. He was a member for many years of the active attending staff at the Children's hospital, and on his retirement therefrom, he was given the honorary appointment of physician emeritus.

Over a period of many years Dr. McFarlen was an active member of the congregation of Gordon United Church, on the board of stewards and trustee board of which he served.

With failing health and despite the physical handicap of same he strove resolutely to continue to discharge the duties of his practice, until, in January, 1944, he was reluctantly obliged to close his office.

Dr. McFarlen is survived by three brothers and three sisters: Thomas, Mount Forest, Ont.; Andrew, Regina, and Wesley, Vancouver; Kezia, Mount Forest; Mrs. W. D. Toye, Toronto, and Mrs. W. A. White, Regina.

Dr. Duncan McLean, of Sacramento, California, died in Toronto on August 13. He graduated from the University of Toronto in 1891.

Dr. William Alexander MacLeod, aged 77, well-known New York physician, died in Yarmouth Hospital on August 5, after an illness of several weeks. Dr. MacLeod was born in Prince Edward Island, son of Angus and Jeanette Montgomery MacLeod.

He is survived by his widow, one son, Herbert, who is publisher of the Yarmouth *Herald-Telegram*, and one brother, Dr. Douglas MacLeod, who is a practising physician in New York.

Dr. Curtis Richard Newman, aged 63, died suddenly on August 7, at his home at 99 Lake Promenade, Long Branch, Ont.

Born in Dunnville, Dr. Newman graduated in medicine from the University of Toronto, and began practising at Dover Centre, in 1905. In 1908, he moved to Toronto, where he practised until his retirement four years ago. He was married in 1910.

Dr. E. F. (Dick) Richardson passed away in the Oshawa General Hospital on August 2 after being seriously ill for the past three months.

Son of the late Mr. and Mrs. Charles Richardson, Dr. Richardson was born in Aurora, Ont., and on his graduation from the University of Toronto went to New York City where he took postgraduate work in eye, ear, nose and throat. He served in the R.C.A.M.C. in World War I with the rank of Captain and prior to coming to Oshawa carried on a practice in Campbellford.

He was a Steward in Simcoe St. United Church and was a former member of the Oshawa Rotary Club.

Besides his widow, the former A. Irene M. Lord, he leaves to mourn his passing two daughters, Elinor and Catherine, both of Oshawa, and one son, F./L. William F. Richardson, R.C.A.F., who has returned from service overseas. Five brothers also survive: Lambert, of Sutton; Dr. H. O. Richardson, of Campbellford; Charles and Dalton, of Aurora; and Austin, of Gormley, Ont.

James Alexander Roberts, C.B., F.R.C.S.(Eng.), died suddenly in Toronto on July 23, 1945, at the age of sixty-seven. He had had a most distinguished military career and was a member of the surgical staff of Toronto General Hospital prior to his retirement from practice in 1925.

A veteran of the South African War, Dr. Roberts had maintained his connection and interest in the Canadian Army Medical Corps and took command of General Hospital No. 4 on its organization in 1915. He served with his unit in Saloniki. In February, 1917, he became commanding officer of No. 15 General Hospital, of Basingstoke Hospital in May, 1917, and later of the Duchess of Connaught Red Cross Hospital. He was one of eight Canadian officers to receive the C.B. at the end of World War I.

Dr. Roberts graduated M.B. from the University of Toronto in 1898 and then studied in England. He obtained his F.R.C.S.(Eng.) in 1904. In 1925 he joined the medical department of the Canada Life Assurance Company and retired from practice. He was a Fellow of the Academy of Medicine, Toronto, from 1914-1929.

Dr. Roberts is survived by his widow and three sons, one of whom is Brigadier J. A. Roberts, D.S.O., now serving with the Canadian Army overseas.

Dr. J. M. Rogers, of Oxford, Ont., died suddenly on August 16. He came to Ingersoll in 1898 and has practised in medicine and surgery since that time. He was known among the profession as one of Western Ontario's most outstanding surgeons.

Born in the Town of Mount Forest, he graduated from the University of Toronto and Trinity Medical School.

He was one of the prime movers in the opening of the Alexandra Hospital here and had served on the hospital trust a number of years. He was a member of the Masonic Order.

He was an enthusiastic bowler and curler and the Ingersoll Lawn Bowling Club has a trophy donated by Dr. Rogers for annual competition within the club. He also enjoyed golfing during the past years.

Besides his widow he is survived by three sons, Major John Reginald, in the military hospital at London; Donald Morrison, of Toronto, and Captain William Parke, recently returned from overseas, where he was a prisoner of war for some time; four sisters, Miss Jean Rogers, Miss Elizabeth Rogers, Mrs. C. A. Myers and Mrs. K. Manson, all of Toronto; a stepson, John Thompson.

Major Mills Shipley, aged 61, of 3039 6th St. W., Calgary, died in Col. Belcher Hospital on July 16.

Born in Clinton, Ont., Dr. Shipley graduated from Western University in London, Ont., in 1912, coming to Calgary from there. He served overseas during the First Great War with the Royal Canadian Army Medical Corps from 1915 to 1919, when he returned to Calgary and started private practice.

He served as a major in the Medical Corps during this war, stationed in Halifax for two and a half years and later at the internment camp hospital in Lethbridge. Ill-health compelled him to retire in September, 1944.

Surviving are his widow, Irene, Calgary; one son, Mills, a graduate of the University of Alberta, now serving with the R.C.N.V.R. in eastern Canada; a brother, Douglas, Toronto, and his step-mother, Mrs. William Shipley, Clinton, Ont.

A brother, Dr. William Shipley, died in Calgary in 1929.

Dr. Abraham Lewis Shubin, aged 51, died at his home in Winnipeg after a short illness on August 13. Coming to Winnipeg when 19 from his birthplace Kiev, in Russian Ukraine, he was educated in high schools and graduated in medicine from the University of Manitoba.

He began practice at Redditt, Ont., but returned to Winnipeg a few years later and developed an extensive practice. He was a good diagnostician, particularly in heart cases. Dr. Shubin was a member of the Canadian Medical Association and the Manitoba Medical Association.

Outside his profession he was especially active in educational work and was prominent in the activities of the Winnipeg Hebrew Free School. Dr. Shubin had the reputation of high and precise scholarship in the Hebrew language and literature. He is survived by his widow, a son and three daughters.

Dr. Gilbert E. Story, aged 67, well-known Edmonton doctor, died at his home on August 14.

Born near Almonte, Ont., where he received his preliminary education, Dr. Story started in the arts faculty at Queen's University and later transferred to medicine. He received his M.D. and C.M. degrees in 1907 and moved to Viking, Alta., where he practised for 11 years. While the Grand Trunk Pacific was being built, he was in charge of medical services between Wainwright and Ryley.

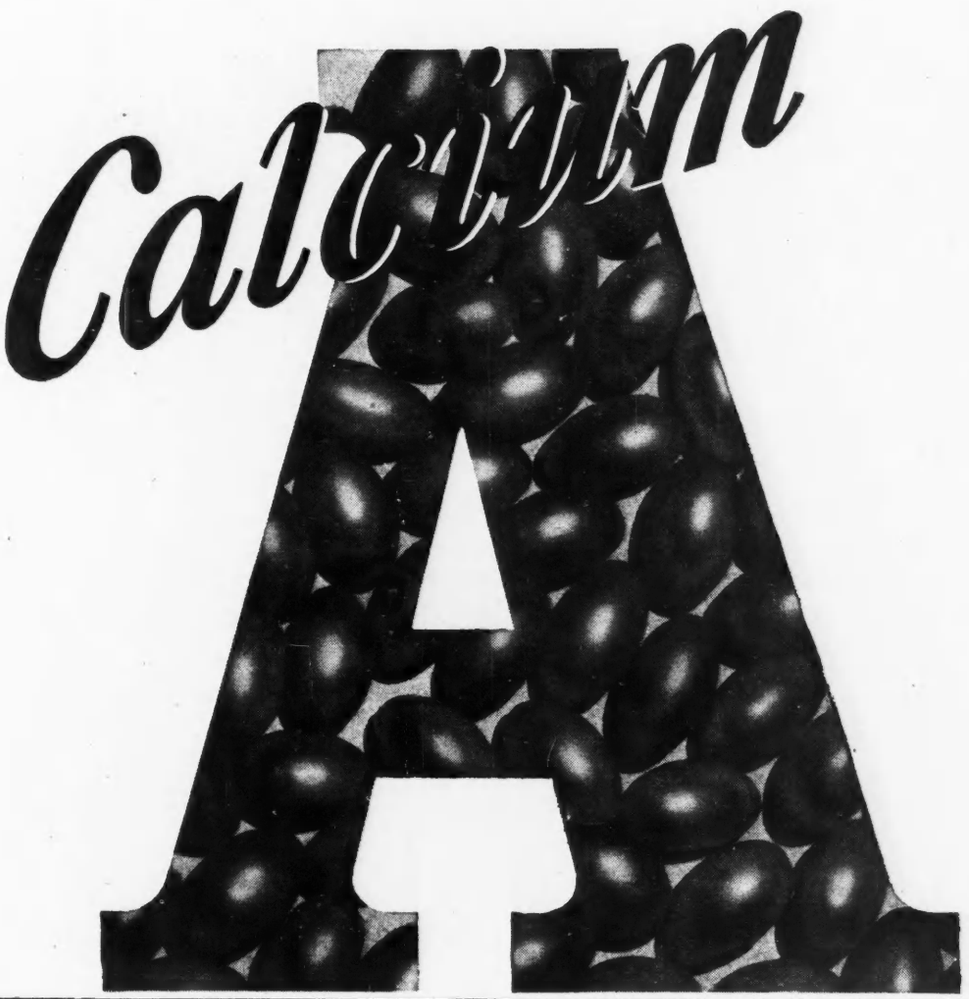
In 1911-12 he went to London, Eng., and took postgraduate work.

He came to Edmonton in 1918 and practised there until his death. In 1928 he travelled in Europe for further medical studies.

Surviving are his widow, one daughter, Mrs. Frances Grant, and one grandson, Robert John Gilbert Grant.

Dr. W. H. Sutherland, of Vancouver (McGill 1899), died recently. His death marks the passing of a well known medical man in British Columbia. He practised for many years at Revelstoke, where he had a very large surgical practice. For many years he took a prominent part in the politics of the Province, being associated with the Liberal Party. His death followed a long illness.

Dr. Charles Augustus Henry Tanner, died at his home in Windsor Mills, Que., on August 10. He was in his 73rd year. His death removes one of the most



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outstanding family physicians in the Eastern Townships.

A graduate of McGill University, Dr. Tanner practised at Ulverston. Later he succeeded the late Dr. Malcolm Mackay, of Windsor Mills, where he served for nearly 40 years.

Dr. Tanner was the second son of the late Rev. Charles A. Tanner, and was born at Sherbrooke. He was educated at Morin College, Quebec, and St. Francis College, Richmond, afterwards attending McGill University to graduate in medicine.

He leaves his widow, formerly Laura Campbell, of Windsor Mills; two sons, Lieut. Charles Tanner and Sgt. Edward Tanner, both on active service; two sisters, Mrs. H. O'Connor Budden, of Niagara Falls, Ont., and Mrs. D. R. MacCrimmon, of Longueuil; and five brothers, Rev. Dr. J. U. Tanner, of Lancaster, Ont.; Rev. William P. Tanner and Edward R. Tanner, of Longueuil; Dr. L. E. V. Tanner, of Toronto; and T. L. Tanner, of Westmount.

Dr. William James Weekes, aged 90, who practised medicine in Western Ontario more than 50 years, died on August 21 in hospital at London, Ont. Retired a few weeks ago, he claimed to be the oldest practising doctor in Ontario. He was a native of Mosa Township.

Dr. F. H. Wells, of Port Elgin, Ontario, died on August 8. He graduated from the University of Toronto in 1891.

AN APPRECIATION

[*We have received the following appreciation of the late Dr. E. M. Eberts from Dr. C. L. Roman, of Valleyfield, Que.*]

Probably the classmates and colleagues of E. M. Eberts might give the details of a surgical career that is outstanding, but there is certainly a great cloud of witnesses among the younger generation who admired him for those attributes he himself found in the late L. J. Rhea—"fine gifts of mind and heart". He belonged to that select and devoted band of clinicians and teachers, who, one by one, are passing from the sight of those younger men to whom were entrusted the intangibles of their lives and profession. To the acolytes who prayed for the light that comes "not by eastern windows only", he contributed his share, by precept and example, in making them high priests and in increasing their stature.

As one of the less elder group who was fortunate to have come within the orbit of his influence, much grace and gratitude would be lacking if his passing were not marked by one word of praise or by one pang of regret. From the rustic perspective of nearly a quarter of century, I look back to think of the hours of intimate personal contact with a warm and generous personality, and to recall the impressions that are "in noble eminence enthron'd and spher'd".

To those who did not know him, he was aloof, austere and reserved, very much "the Baron" as he was known with respectful affection, but he had a heart of gold and a rich fund of humour. In the words of a nurse who, in the last sad phase, shared his anxious days and weary nights, "he was the salt of the earth". Apart from his skill and master craftsmanship in his chosen field, his tastes were those of a scholar and gentleman; he was a lover of the fine arts.

As to many others, he was my friend, my counsellor, my patron. Twenty-five years ago, after a decade of suffering, he operated upon me, set my feet upon the road to health, and cheerily waved me to my life work with a song upon my lips. That event was marked each year with an exchange of letters that revealed his soul and his deep, never-waning interest. I spoke with him last when, with visible effort, he attended Dr. L. J. Rhea's funeral service. Even then, he was standing in the path of the dark arrow of fate. Shortly after, I received his twenty-fourth note of recollection and we both looked forward to the silver jubilee of that far-off day in June. . . .

The treasure of that sheaf of letters will be a memorial to the life of one who was reared in the nurture and admonition of the traditions of a great hospital and of great men.

C. L. ROMAN

News Items

British Columbia

Amongst medical men returned from overseas are Colonel M. McC. Baird, of Vancouver, and Lieut.-Col. Roy Huggard, both of whom have seen service overseas for several years. Others on leave are: Lieut.-Col. J. S. McCannel, Victoria, Lieut.-Col. C. E. G. Gould, Vancouver, Major R. D. Coddington, formerly Ocean Falls, Major G. B. Bigelow and Major N. C. Cook, of Victoria, Major A. Maxwell Evans, Vancouver; Major J. A. Ganshorn, Vancouver, Major Gordon C. Large, Vancouver, Major D. B. Roxburgh, Victoria, Major A. J. Stewart, of Prince Rupert, and Major J. Moscovich, Vancouver.

Capt. J. A. McCaffrey, R.C.A.M.C., has returned to practice in Vancouver.

A Joint Study Committee on Health Insurance has been formed, consisting of: The British Columbia Hospitals Association, British Columbia Dental Association, Registered Nurses Association of British Columbia, the Pharmaceutical Association of British Columbia, and the British Columbia Medical Association. These organizations arranged a roundtable conference on the subject of Health Insurance, which was held on September 11, the day preceding the annual meeting of the British Columbia Medical Association. The meeting was open to all members of these various organizations.

All arrangements for the annual meeting of the British Columbia Medical Association are now complete. We are looking forward to hearing from the President of the Canadian Medical Association, Dr. Léon Gérin-Lajoie, and the General Secretary, Dr. T. C. Routley, who are attending the meeting.

A golf tournament has been arranged and a luncheon and dinner. At the dinner, the guest speaker will be the Very Reverend Cecil Swanson, Dean of Christ Church Cathedral, Vancouver.

Manitoba

The appointment of Squadron Leader William Norman Venables, R.C.A.F., as Winnipeg's new sanitary engineer, was recommended by the civic health committee on August 20. The creation of such a position was urged in 1941 by Dr. Carl Buck, of the American Public Health Association, who conducted a survey of the city health department's requirements. Squadron Leader Venables is a graduate in engineering of the University of Manitoba and has four years' service in the R.C.A.F.

Hon. D. L. Campbell, minister of agriculture, has announced the formation of a rural housing committee. Such a step was requested by the Advisory Committee on Co-ordination of Post-war Planning. The chairman of the committee is the business manager of the Manitoba River Commission. With the proposed extension of electrical service to forty villages

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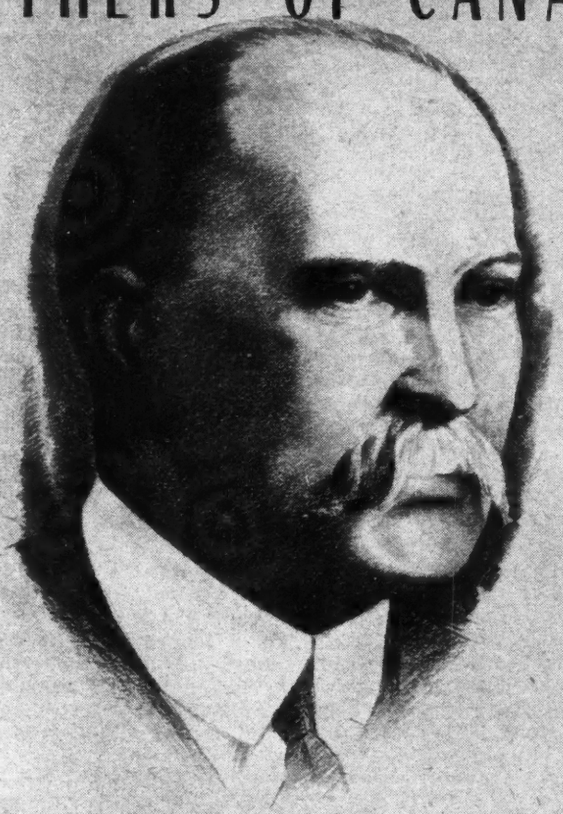

Sir William Osler

Bart., M.D., D.C.L., LL.D., D.Sc., F.R.S., F.R.C.P.
1849-1919

MORE than any other man Osler exemplified all that was best in the tradition and practice of medicine. One of nine children, he was born in 1849 at Bond Head, Ontario, and obtained his professional education at Toronto and McGill Universities. In those early days students assisted a practising physician while at college. Osler's preceptor was Dr. James Bovell, a country practitioner of broad culture.

After studying abroad, Osler was given the Chair in Medicine at McGill University. Later, he was appointed professor of clinical medicine in the University of Pennsylvania; Gulstonian lecturer at the Royal College of Physicians, London; professor of medicine at Johns Hopkins University; and regius professor of medicine at Oxford.

His contribution to the profession of medicine was outstanding. To him is attributed the adoption of bedside teaching and the system of internship which afforded students an opportunity to obtain practical experience before engaging in practice.

Osler's text-book "The Principles and Practice of Medicine" was so clear, concise and comprehensive that it was adopted as the standard text-book of medicine by all English-speaking universities. It has been revised and expanded on a number of occasions. While at McGill, he published the "Pathology Reports" which were the first of the kind in America.

Osler was unselfish even to effacement. The generosity of his hospitality was open-hearted and his entertainment of guests delightful. He had a richly endowed mind. His name will live not only because of his great contribution to medicine but also because of his "little nameless unremembered acts of kindness and love." He was known and beloved in America, Great Britain and the Dominions.

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in Manitoba the committee hopes to take the drudgery out of farm homes.

Three groups of Manitoba municipalities, Swan River, Portage la Prairie and Ste. Anne, have passed the necessary resolution asking the provincial government to establish full health services in line with the preventive part of the Health Services Act passed at the last session of the legislature. Action will be taken by the government as soon as medical personnel can be obtained.

Dr. Digby Wheeler, St. James, won for the third time the Bank of Commerce trophy for grounds of 66 feet frontage or over in greater Winnipeg. He was also runner-up for the Shaughnessy trophy for the finest garden of any size.

Dr. R. R. Swan, Winnipeg, president of the Winnipeg Beach Golf Club, recently made a hole in one on the Winnipeg Beach course. He was accompanied by his two doctor sons, one of whom, Robert Swan, has recently returned from several years of service.

Capt. Donald Whyte, R.C.A.M.C., a graduate of the faculty of medicine, University of Manitoba, and now with No. 4 Canadian General Hospital in England, has recently been appointed to the rank of major.

ROSS MITCHELL

New Brunswick

The Royal Commission composed of Chief Justice J. B. M. Baxter, Rev. L. M. Pepperdene and Mr. E. B. Sweeney, appointed by the Government of New Brunswick to investigate charges of maladministration and abuses by the *Montreal Standard*, alleged to have occurred at the Provincial Hospital for the Insane at Fairville, has presented its report to the Premier of the Province. Its recommendations include: (1) The erection of a new modern psychopathic hospital in the north of the Province for French-speaking patients. (2) The erection of a separate institution for mentally deficient children. (3) The removal of all military patients to special military mental hospitals. (4) An increase in medical, nursing and domestic staff as soon as such staff is available.

The Royal commission gives special commendation to the present medical staff for the manner in which they have carried on during the past five years, in spite of wartime difficulties and an increasing hospital population.

Dr. C. A. Bonner of Danvers State Hospital, Hathorne, Mass., was called by the Commission as an authority on mental institutions. His report was the basis for many of the recommendations and he especially commended the work of Dr. E. C. Menzies and his staff working under most difficult circumstances.

Lieut.-Col. R. A. H. MacKeen has returned to Canada from overseas. During his overseas stay he rendered distinguished services to the R.C.A.M.C. as a consulting pathologist. His experience in Public Health, Serology and Bacteriology in the Laboratories of the N.B. Department of Health was exploited to the advantage of Army medical services to Canadian and British troops. He will shortly resume his position in the Department of Health when debarkation leave is completed.

Dr. Norman McLellan lately discharged from the R.C.A.M.C. is now practicing in Sussex, N.B.

The Commissioners of the Saint John General Hospital recently made two new appointments to the eye, ear, nose and throat department when Dr. D. Russell MacRae, a graduate of Dalhousie University and Dr. Samuel Silver of McGill were added to the war depleted staff.

Hon. Dr. F. A. McGrand, Minister of Health has announced the appointment of Dr. Jean Webb as Provincial Medical Nutritionist, perhaps the first such appointment in Canada. This new service is launched with the co-operation and assistance of the International Health Division of the Rockefeller Foundation, which will give financial assistance for three years. Dr. Webb graduated from McGill, interned at the Royal Victoria Hospital and Toronto Hospital for Sick Children, and received her D.P.H. from the Toronto School of Hygiene. This was followed by a special study on a Rockefeller fellowship and a tour of nutritional service centres in larger centres in U.S. and Canada.

Lieut.-Col. A. S. Kirkland, E.D., has relinquished command of No. 14 (R) Field Ambulance which he recruited in July, 1940, thus completing twenty-nine years' service in the R.C.A.M.C. Overseas in the last war, Dr. Kirkland served with a No. 1 C.C.C.S., then served continuously in the N.P.A.M. When the present war broke out he recruited the 14th Field Ambulance, C.A.S.F. and commanded it for eight months, when he retired due to illness, following which his reserve army duties were re-assumed. Major A. L. Donovan, of Saint John, now commands the 14th (R) Field Ambulance.

Lieut.-Col. Jos. Tanzman, R.C.A.M.C., has returned to Canada. He commanded No. 14 Field Ambulance from Normandy to Germany with distinction. He has served from September, 1939, to date. Previous to the war Dr. Tanzman had a long service in the N.P.A.M. He will shortly resume practice and his hospital appointment in Saint John.

A. STANLEY KIRKLAND

Ontario

The Ontario Medical Association has prepared attractive cards to be displayed in the waiting rooms of physicians. They contain a well worded reminder that patients are expected to recognize the return of their doctor from duty in the armed forces by consulting him when necessary and that the service they have been receiving has been given as a compliment to a colleague in his absence.

Dr. J. Harris McPhedran has been appointed Physician-in-Chief in St. Michael's Hospital, Toronto. He will also become Assistant Professor in Medicine in the University of Toronto.

M. H. V. CAMERON

Quebec

Les *Journées Médicales Annuelles* de la Société Médicale de Montréal, précédemment annoncées pour le début d'octobre, auront lieu les 22, 23, 24 et 25 octobre prochain, sous la présidence du Dr Paul Letondal.

Le programme général de ces assises comprendra: 1° chaque matin, de 9.30 à 12.30, un symposium sur une question d'actualité; 2° une causerie d'intérêt général pour la profession, à l'issue d'un déjeûner gracieusement offert aux membres de la société; 3° l'après-midi, de 2.30 à 4h., une série d'exposés sur les nouveautés en médecine; 4° le soir, étude d'un problême médical ou chirurgical par un conférencier étranger de marque.

A l'issue du banquet annuel, le soir du 25 octobre, un invité d'honneur, délégué du Gouvernement français, prononcera une causerie para-médicale, d'ordre littéraire.

Les 4 grandes questions d'actualité à l'ordre du jour sont: le sang et les dérivés du sang; la radiothérapie; l'analgésie et l'anesthésie en obstétrique; la pénicilline.

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Un nouvel hôpital s'ouvrira prochainement à Sorel. Cet hôpital, qui s'appellera l'Hôtel-Dieu de Sorel sera confié aux Religieuses Hospitalières de St-Joseph.

Le Dr Edmond R. Dufresne vient d'être nommé directeur du Service de Santé de la Cité d'Outremont.

A leur réunion du 27 juin dernier, les membres de l'Association des Médecins de l'Est de Montréal ont élu à la présidence de leur association le Dr J. A. Rouleau.

Les membres de la Société Médicale de Montréal, réunis en assemblée régulière, le 24 avril 1945, expriment le vœu qu'une clinique antialcoolique soit établie à Montréal, où des médecins, des neurologues, des psychiâtres, des psychologues apporteront leur contribution au traitement de ces malades. JEAN SAUCIER

We feel sure that the many friends of Brigadier H. M. Elder, D.S.O., E.D., will be glad to read in full the citation in accordance with which he received his decoration:

Action for which commended

Colonel Elder was A.D.M.S. of 5 Canadian Armoured Division from May, 1941 to May, 1944. During this period he was untiring in his efforts to train the Medical Units under his command in order to fit them for battle. Through his enthusiasm, initiative, drive and thorough understanding of the various phases in the operation of his branch of the Service, the Medical Units of the Division entered the campaign in Italy ready and able to face any test to which they might be subjected.

During the periods in which these units were committed to action, Colonel Elder was constantly in the forward areas, visiting his advance sections and regimental aid posts. Such posts necessitated travel through, and being in, areas which were constantly under enemy observation and fire. Heedless of the risks which had to be undertaken, however, this officer was ever ready to encourage and assist, by every means in his power, those personnel responsible for the evacuation and care of casualties.

The personal example and devotion to duty of Colonel Elder, together with this outstanding determination to ensure that every possible care was given to casualties, was an inspiration to all under his command. This has resulted in all ranks of the Division possessing illimitable faith in the Medical Services, secure in the knowledge that if wounded or sick, they will receive the best of medical care at all times.

Colonel Elder has now returned to Canada, and we understand is soon to be released from military duty after his long and distinguished career in uniform. His abilities were early recognized, and he rose to be D.D.M.S. of the First Canadian Army.

Saskatchewan

Five new men have recently registered in the Province, these are: Dr. Joseph Gonty, M.D., Manitoba, 1935, recently located at Saltcoats; Dr. John W. Bawden, M.D., Manitoba, 1945, Regina; Dr. R. Michael Lattery, graduate of Oxford 1939, and formerly of St. George's, Bermuda, who has taken over the practice of Dr. B. H. Lyons at Birch Hills; Dr. Mindel C. Sheps, M.D., Manitoba, 1936, at present secretary of the Health Services Planning Commission at Regina; and Dr. Lorne M. Phillips, M.D., Toronto, 1942, located at Central Butte.

Saskatchewan Medical Officers continue to return to civilian practice following service in Canada and overseas.

Captain W. R. Fraser who was with the R.C.A.M.C. for about three years has resumed practice at Arcola.

Major J. B. Trudelle resumed practice some time ago in Regina following more than four years' service with the R.C.A.M.C. Dr. Trudelle was with No. 8 General Hospital unit for some time.

Major A. R. Coulter with the R.C.A.M.C. for five years has returned to the staff of the Weyburn Mental Hospital.

Captain A. L. H. MacNeill with the R.C.A.M.C. for about four years has returned to his practice at Shaunavon.

Captain H. M. Bigelow has opened an office in Regina after service with the R.C.A.M.C. for over two years.

Following postgraduate work in the United States, Dr. G. F. Nelson has become superintendent of the North Battleford Mental Hospital succeeding the late Dr. J. W. MacNeill.

Dr. C. R. Scribner, who practised for some years at Antler, Sask., is now located at Teulon, Manitoba.

Dr. B. E. Knapp, formerly of Prince Albert, has opened an office at the West Coast.

Dr. J. H. Duncan, who practised for a short time at Saltcoats, has returned to Alberta to locate at Oyen.

Effective September 1, 1945, it is now compulsory in Saskatchewan for both parties to have a pre-marital blood test for syphilis performed within thirty days of the marriage date.

It is left entirely to the judgment of the physician as to whether or not a certificate should be issued. This will depend upon whether or not cases discovered in this way are considered by the physician to be in an infectious state or likely to become infectious.

Many will be pleased to hear that our acting registrar, Dr. J. A. Valens, who has recently undergone an operation at the Saskatoon City Hospital, is continuing to improve.

The College of Physicians and Surgeons requests that all returning ex-service men and others who are undertaking a new practice or resuming practise should consult with the registrar before such contracts are signed.

General

The following Privy Council ruling has been promulgated.

Whereas Section IX of the regulations under the Food and Drugs Act, made by Order in Council P.C. 9,056, dated October 6, 1942, and amended by Order in Council P.C. 6,725, of August 26, 1943, deals with grain and bakery products;

And whereas Paragraph 4(*a*) thereof sets forth regulations in regard to bread and, amongst other things, provides that it shall be a product made by baking a yeast-leavened dough prepared with flour, water and salt, and with or without any of the following, amongst other, ingredients,—edible fat, edible oil, milk or milk product;

And whereas due to wartime restrictions resulting from shortage in the supply of sugar, fats and certain milk products, it is deemed desirable to permit the use of glycerine as an ingredient of bread;

Therefore, His Excellency the Governor General in Council, on the recommendation of the Minister of National Health and Welfare, and under the authority of the War Measures Act, Chapter 206, Revised Statutes of Canada, 1927, is pleased to order and it is hereby ordered as follows:

Notwithstanding the regulations under the Food and Drugs Act, and in particular paragraph 4(*a*) of Section IX thereof, glycerine may be used as an ingredient of bread.

DIPHTHERIA TOXOID AND PERTUSSIS VACCINE (COMBINED)

The death rate from diphtheria and whooping cough is highest among children of pre-school age. It is desirable, therefore, to administer diphtheria toxoid and pertussis vaccine to infants and young children as a *routine procedure*, preferably in the first six months of life or as soon thereafter as possible.

For use in the prevention of both diphtheria and whooping cough the Connaught Laboratories have prepared a combined vaccine, each cc. of which contains 20 Lf's of diphtheria toxoid and approximately 15,000 million killed bacilli from freshly-isolated strains (strains in Phase 1) of H. pertussis.

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The combined vaccine calls for fewer injections, and, in consequence, the number of visits to the office or clinic may be considerably reduced. It is administered in three doses with an interval of one month between doses.

DIPHTHERIA TOXOID & PERTUSSIS VACCINE (COMBINED) is supplied by the Connaught Laboratories in the following packages:

Three 2-cc. ampoules—For the inoculation of one child
Six 6-cc. ampoules—For the inoculation of a *group* of six children

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UNRRA Seeks Medical Help for China. — The Chinese Government has requested UNRRA to provide, as soon as possible, some 200 field personnel of the following categories to strengthen the available Chinese personnel. Such personnel will be required to head the respective services in hospitals of 100 or 250 beds, which will be established in areas recently liberated from the Japanese. General surgeons, orthopædic surgeons, genito-urinary surgeons, gynæcologists and obstetricians, general physicians, dermatologists and syphilologists, ophthalmologists, otolaryngologists, radiologists, dentists, pædiatricians, laboratory technicians, x-ray technicians, sanitary engineers, public health engineers, public health nurses, clinical nurses.

General practitioners with some specialist experience will be acceptable. Candidates should be under 55 years of age and in good physical condition. Address Dr. Szeming Sze, Chief, Far East Section, Health Division, 1344 Connecticut Ave., N.W., Washington 25, D.C.

Cholera in China.—The cholera epidemic at Chungking is no longer on the increase, according to a statement made by Dr. Knud Stowman in Epidemiological Information Bulletin No. 13 of UNRRA, which has just been issued. The epidemic now extends to most of Szechwan province and has spread to the provinces of Kweichow and Hupeh, and as far westward as Yaan near the border of Tibet.

In India cholera remains prevalent in the Ganges Valley, and is rapidly increasing in Bombay Presidency. The disease has also appeared in Delhi, but so far there are few cases. There has been no cholera case west of India since 1939. Following World War I there were serious cholera epidemics in India and Russia and some cases as far west as Poland.

Penicillin in Greece. — Distribution of penicillin given by UNRRA to Greece began in August under the supervision of a committee composed of seven prominent Greek doctors and professors of medicine and pharmacology.

Cabled reports from Athens state that the allocation of present limited supplies has been confined to Athens and Salonica, and no more than 60 to 65 persons can be treated per day. However, as soon as the disease destroying drug can be made available in larger quantities a proportionate share will be sent to the provinces. Because of its scarcity the use of penicillin is reserved to those cases which would fail to respond to other treatment.

Shortly after liberation, Greek physicians brought to the attention of UNRRA not only the needs of the country for modern drugs like penicillin, but also for up-to-date information regarding their use. During enemy occupation their medical men had been completely isolated from the world developments of their profession. Preparatory to receiving UNRRA shipments of penicillin, Dr. Albert Mendeloff, of Charleston, West Virgina, USPHS physician now with the UNRRA mission in Greece gave a special lecture before 250 local doctors on its properties and clinical application. A committee was selected to supervise distribution and a program worked out for the treatment of patients, and for the strict control of the drug.

In the meantime small quantities of penicillin began appearing on the black market. One vial cost as much as 3 gold pounds, the equivalent of about ninety dollars in American money. It was usually old and had deteriorated in quality. Whatever might have been of value was wasted since few patients could afford to buy a quantity sufficient to complete a full course of treatment.

No penicillin has been reported on the black market since the distribution of supplies began under Committee surveillance. UNRRA imported penicillin is stored under armed guards in a large cold storage plant in Athens. Vials to cover each day's supplies are taken to the hospital where the dispensary is located, and given only to persons bringing signed authorizations. All empty or unused vials are returned. The price is moderate but scaled to fit the ability to pay, the destitute receiving the drug free of charge. Until more penicillin is shipped in, doctors from the provinces can apply for it in dangerous cases through Athens or Salonica.

Grant by Wellcome Trustees for Rebuilding of Royal College of Surgeons.—The late Sir Henry Wellcome of the firm known all over the world as Burroughs Wellcome & Co. was a great philanthropist who devoted his wealth to the endowment of research. He settled in England and in 1923 resolved to consolidate his many interests in this country, America and elsewhere—research laboratories, medical museums and libraries, development and manufacturing laboratories, distributing companies and organizations. For this purpose he formed The Wellcome Foundation. He died in 1936 at the age of 82 and left a will unique among testamentary documents. All the shares in the foundation were vested in five trustees, whose aim he laid down to be "the advancing of research work bearing upon medicine, surgery, chemistry, physiology, bacteriology, therapeutics, materia medica, pharmacy and allied subjects". During his life he founded in London the Wellcome Laboratories of Tropical Medicine, the Wellcome Historical Medical Museum and Library and the Wellcome Museum of Medical Science, as well as other laboratories. He empowered his trustees to make grants for the foundation and extension of museums. They have granted $400,000 for the construction of three new museum floors at the Royal College of Surgeons on condition, according to the terms of the trust, that the name "Wellcome" is associated with the extension. The council of the college gratefully received the offer and decided to name one of the new buildings the "Sir Henry Wellcome Wing".

Journals wanted.—The library of the D.G.M.S. Directorate is very anxious to obtain the following journals:

Bulletin of Hygiene (England)—issues of February and March, 1944.

Journal of Industrial Hygiene and Toxicology, Vol. 26, No. 3, March, 1944.

Any physician who has a copy of these periodicals which he can spare would be conferring an obligation on the Directorate by forwarding them to the Canadian Medical Procurement and Assignment Board, Department of National Defense, Ottawa.

The Louis Gross Memorial Lecture.—The eighth annual Louis Gross Memorial Lecture will be delivered at the Jewish General Hospital, Montreal, on Wednesday, October 17, 1945, at 8.30 p.m., by Dr. Paul Dudley White, of Boston. The subject will be "The heart in hypertension since the days of Richard Bright".

Book Reviews

Dietotherapy, Clinical Application of Modern Nutrition. Edited by M. G. Wohl, Associate Professor of Medicine, Temple University School of Medicine. 1029 pp., illust. $11.50. Saunders, Phila.; McAinsh, Toronto, 1945.

This book might well be considered a compact reference text on nutrition. No less than fifty-eight American teachers have contributed, each in his own field. It is evident that each contributor has been advised that he is presenting his article to the general practitioner, and to the field of medicine generally. As a result each chapter is thoroughly readable and most are packed with information that can readily be transposed to clinical medicine. The

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PULMONARY TUBERCULOSIS IN THE ADULT

By Max Pinner, Montefiore Hospital for Chronic Diseases, New York. This new book deals with the fundamental aspects of pulmonary tuberculosis in adults. Its object is to form rational and consistent attitudes to the problem as a whole, and to provide the basically necessary foundations on which practical work should proceed. Clinic, Pathology, Epidemiology, etc., are not considered as different topics, but as different facets of one entity. 63 illustrations and graphs, 581 pages. $10.25.

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WANTED.—At once. An assistant physician for an active general practice in northern Ontario. Must be qualified to do emergency surgery. Good opportunity. State full particulars regarding qualifications, religion, etc. Apply nearest Employment and Selective Service Office. Refer H.O. 2301.

WANTED.—Municipal doctor for the Rural Municipality of Hart Butte No. 11 at once. The Municipality comprises nine townships, with three small hamlets and one village within its boundaries. Population about 1,400. A suitable residence will be furnished at a reasonable rental. Please state particulars regarding salary required and age to E. A. Winter, Secretary-Treasurer, Coronach, Sask.

WANTED.—Eye, Ear, Nose and Throat Specialist—Ontario city. Every facility for up to date work. Laboratory, x-ray and library, etc. Practice may be acquired only (1) On rental basis. (2) On guaranteed salary. (3) Guaranteed basic salary with bonus additions. Those employed in war work need not apply. Apply nearest Employment and Selective Service Office. Refer H.O. 1832.

WANTED.—By medical clinic in Central Ontario, a trained obstetrician and gynæcologist; also a surgeon with training in urology, both preferably under forty years of age. Apply National Employment Service, E. & P. Section, 832 Bay St., Toronto 5. File No. EPS 864.

WANTED.—A Medical Superintendent to take complete supervision and control of the visiting medical staff, the nursing staff and the admission and discharge of patients. Bed capacity —Calgary General Hospital—322 beds and 60 bassinettes. Isolation Hospital—80 beds. Apply to Employment and Selective Service, Burns Building, Calgary, Alta. Order number 811-4812.

FOR SALE.—Practice of deceased physician. Fastest growing town in South Western Ontario. Hospital and clinic connections. Little opposition. No real estate. Real opportunity for remunerative practice in the best surroundings. Apply Box 425, Canadian Medical Association Journal, 3640 University Street, Montreal 2, Que.

FOR SALE.—Reasonable price. Complete contents of deceased physician's modern office—furniture, equipment, and medicines. Apply Box 432, Canadian Medical Association Journal, 3640 University Street, Montreal 2, Que.

FOR SALE.—Physician's residence and office combined, Huron County, Ontario. Village practice, unopposed. Good hospital, 10 miles. Fine farming district. Possession, immediately. Price, thirty-five hundred. Apply Box 433, Canadian Medical Association Journal, 3640 University Street, Montreal 2, Que.

FOR SALE.—Good general surgical and medical practice in Chatham, Ontario. Owner retiring on account of ill health. Apply Box 332, Chatham, Ont.

FOR SALE.—Microscope, Spencer make, good as new, also surgical instruments and appliances, complete obstetrical bag, write Box 160, Timmins, Ont.

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chapter on "The Physiology of the Gastro-Intestinal Tract and its bearing on Nutrition", as an instance, seemed to cover the whole subject and all in twenty-four very readable pages.

The book is divided into three sections. Section 1 covers normal nutrition as applied to each food element, minerals, vitamins, etc. The story of the vitamins is indeed a romance. The contribution that nutrition has given the medical world in the past twenty-five years, through the agencies of vitamins alone constitutes a revolution in both preventive and curative medicine. The rôle played by proteins in the health of the nation is made very evident. Emphasis is placed on more proteins in our diet than heretofore. The relation of proteins not only to diet but to water balance, œdema, shock, etc., is well told. More emphasis is put on amino acids of proteins than is perhaps necessary in view of the prohibitive cost of amino acid as a therapeutic measure. More might have been said about protein fractions and their practical potentialities.

Part 2 deals with nutrition in physiological stress, *i.e.*, in pregnancy, infants, aged, etc. Each chapter is well worth while. Part 3, Nutrition in Disease, constitutes half the book. Here is indeed a most useful reference to the nutritional side of almost any disease —and let us remember that there is a nutritional side to every ailment.

As is so often the case, the Foreword and the Appendix to the volume are extremely valuable portions. The book is recommended unconditionally to any and every medical practitioner. It should be a welcome addition to every library.

Medical Care of Merchant Seamen, a Handbook of Ship and Aircraft Sanitation and Emergency Medical Aid. W. L. Wheeler, Medical Director, Grace Line, Inc. 212 p.p., illust. $2.00. Cornell Maritime Press, New York; General Publishing Co., Toronto, 1945.

This little handbook of ship and aircraft sanitation and emergency medical aid was not prepared for the guidance of ships' medical officers. It is essentially a pocket guide for the use of executive officers and first-aid men. For the most part the material is presented in language intelligible to the layman and a wide field is covered in brief compass.

A great deal of useful medical data is included along with innumerable certificate forms applicable only to ships serving under U.S. Maritime laws.

One feels that the manual would have been more valuable to laymen if it had been prepared as an index of symptoms and hygiene problems. By means of a running key to the main features of the problem in hand a solution could be cleared with more exactitude. Few ship's officers are sufficiently interested in a medical handbook to spend an evening in their cabin digesting data which may never require practical application. As a work of reference it is too brief. Its chief value is to the Grace Line.

Immuno-Catalysis. M. G. Sevag, Assistant Professor of Biochemistry in Bacteriology, University of Penna. 272 pp., illust. $6.00. Thomas, Springfield; Ryerson Press, Toronto, 1944.

This book deals with the theory of "immuno-catalysis" and the integration of fundamental aspects of immune reactions and of enzyme reactions. The correlation of experimental studies by leading biochemists and immunologists is an attempt to overcome the isolationism which as Mudd says is "a phase of narrow understanding and immaturity". Antigens are considered as biocatalysts and the study of these as the producers of antibodies with specific properties reveals their catalytic nature. The various theories on the mechanism of antibody formation of Breinl and Haurowitz, Mudd, Alexander, Sabin, and Pauling are discussed and analyzed on the basis of the author's views. Similarly well known chemical type reactions are considered and the conclusion derived from all of these is that a reasonable explanation is offered for the formation of immune bodies under the specific influence of antigens. The following facts are accepted. Antigens produce disproportionately large amounts of immune bodies, are not incorporated stoichiometrically into the chemical structure of the antibody molecule, and the reaction they create is thermodynamically possible. True catalysis as well as antigens require these characteristic criteria. Specific inhibitors in enzyme reactions, the analogy of these to antibodies, the synthesis of globulin molecule antigens are among the subjects adequately discussed. Anti-enzyme immunity, a controversial topic, immunity against bacterial enzymes, antibody formation against respiratory enzymes, and related problems are clarified by the analysis of many useful facts in a new and enlightening way. Anyone interested in the basic theories of biochemistry, bacteriology, immunity and the mechanisms of infectious diseases will find here a valuable reservoir of facts and a stimulus to research.

An Introduction to Physical Methods of Treatment in Psychiatry. W. Sargant, Medical Officer, Maudsley Hospital; Deputy Clinical Director, Sutton Emergency Hospital; and E. Slater, Medical Officer, Maudsley Hospital. 170 pp. $2.50. Livingston, Edinburgh; Macmillan, Toronto, 1944.

This handbook deals with the technique of the newer "physical" treatments used in psychiatric cases excluding occupational therapy and physiotherapy, but including malaria treatment of general paresis. The authors are experienced in these new techniques and their great experience will be most useful to those who are already engaged in applying these methods, as well as others who might wish to adopt them in hospital and general practice. They give sufficient technical details as well as general principles. Unfortunately, there is no bibliography, but this may be understood in a small very readable book, printed under wartime conditions, since the authors obviously know the literature quite well and it is very extensive.

The following selected chapters would probably be of most interest to general practitioners: (II) Modified Insulin Therapy. (III) Convulsion Therapy. (IV) The Treatment of Cerebral Dysrhythmia. (V) Chemical Sedation and Stimulation. (VII) Some Special Uses of Intravenous Barbiturates. (VIII) Diet, Vitamins and Endocrines. (IX) Prefrontal Leucotomy. (XI) The Relation of Psychological to Somatic Treatment.

A Textbook on Pathology of Labour, the Puerperium and the Newborn. C. O. McCormick, Clinical Professor of Obstetrics, Indiana University School of Medicine. 399 pp., illust. $8.75. Mosby, St. Louis; McAinsh, Toronto, 1944.

This work is the outcome of twenty-five years of bedside and classroom teaching. Its style is that of a professor's notes, but the fruits of long and extensive experience are offered in compact form. The term "pathology" in the title is to Canadian eyes somewhat misleading; what the book portrays are the difficulties and emergencies of obstetric practice. The aim of the author has been to set forth only the essentials of present-day obstetrical thought, and that aim has been reached. Mention of such newer obstetrical aids as puerperal sterilization, sulfonamides, penicillin, stilbœstrol, vitamin K, erthryoblastosis and the Rh factor, and improved analgesia and anæsthesia, shows that the book is thoroughly up to date. A limited number of selected references are inserted throughout the text, thus enabling the reader who is especially interested in a particular subject to do wider reading.

This book should be helpful to the student of obstetrics and even more helpful to obstetrical interns, residents and recent graduates. While obstetrical procedures and operations are carefully and fully described, emphasis is constantly placed on prophylaxis and the value of gentleness and skill. Dr. McCormick shows himself to be a competent and wise teacher.